

SAFETY.CAT.COM™

MAINTENANCE INTERVALS

Operation and Maintenance
Manual Excerpt

Operation and Maintenance Manual

657E Wheel Tractor-Scraper

5YR1-Up (Machine)
6PR1-Up (Scraper)
6TR1-Up (Machine)
7KR1-Up (Scraper)

i01922460

Maintenance Interval Schedule

SMCS Code: 1000; 7000; 7500; 7519

Note: All safety information, warnings, and instructions must be read and understood before you perform any operation or any maintenance procedure.

Before each consecutive interval is performed, all of the maintenance requirements from the previous interval must also be performed.

When Required

Battery - Recycle	94
Battery or Battery Cable - Inspect/Replace	94
Circuit Breakers - Reset	101
Cutting Edges and End Bits - Inspect/Replace ...	108
Draft Arm Flange Bolts - Check	113
Draft Arm Wear Plates - Check/Adjust	113
Ejector Carrier Rollers - Check/Adjust	114
Ejector Guide Rollers - Check/Adjust	114
Ejector Support Rollers - Check/Adjust	115
Engine Air Filter Primary Element - Clean/Replace	116
Engine Air Filter Secondary Element - Replace ..	118
Engine Air Filter Service Indicator - Inspect/Replace	119
Engine Air Filter Service Indicator Screen - Check/Replace	120
Engine Transfer Gear Scavenge Screen - Clean	128
Ether Starting Aid Cylinder - Replace	129
Ether Starting Aid Cylinder - Replace	130
Fuel System - Prime	130
Fuel System - Prime	131
Fuses - Replace	135
Hydraulic Tank Breaker Relief Valve - Clean	141
Oil Filter - Inspect	141
Seat Accumulator - Check	143
Seat Oil Line Screen - Clean	144
Window Washer Reservoir - Fill	156
Window Wiper - Inspect/Replace	156
Windows - Clean	157

Every 10 Service Hours or Daily

Air Tank Moisture and Sediment - Drain	93
Backup Alarm - Test	93
Brakes, Indicators and Gauges - Test	99
Cooling System Coolant Level - Check	105
Differential and Final Drive Oil Level - Check	111
Engine Air Filter Primary Element - Clean/Replace	116
Engine Air Filter Service Indicator - Inspect	119
Engine Air Precleaner - Clean	120
Engine Oil Level - Check	124
Engine Oil Level - Check	125
Fuel System Water Separator - Drain	134

Fuel System Water Separator - Drain	134
Fuel Tank Water and Sediment - Drain	135
Hydraulic System Oil Level - Check	140
Push Plate - Lubricate	142
Radiator Core - Clean	142
Seat Belt - Inspect	144
Transmission Oil Level - Check	153
Transmission Oil Level - Check	154

Every 50 Service Hours or Weekly

Bail Bearings and Push Plate Spring - Lubricate ..	94
Bowl Lift Cylinder Bearings - Lubricate	96
Cab Air Filter - Clean/Replace	101
Hitch - Lubricate	137
Tire Inflation - Check	146

Every 250 Service Hours or Monthly

Air Dryer - Check	92
Air Dryer Desiccant - Replace	92
Battery - Clean/Check	94
Belt - Inspect/Adjust/Replace	95
Brake Air System Pressure - Test	97
Braking System - Test	99
Engine Oil (High Speed) and Oil Filter - Change ..	122
Engine Oil (High Speed) and Oil Filter - Change ..	123
Engine Oil Sample - Obtain	125
Engine Oil and Filter - Change	126
Engine Oil and Filter - Change	127
Fan Drive Bearing and Belt Tightener - Lubricate	130
Hydraulic System Oil Sample - Obtain	141
Transmission Oil Sample - Obtain	154
Transmission Oil Sample - Obtain	155

Every 500 Service Hours or 3 Months

Accumulator (Cushion Hitch) - Check	92
Brake Camshaft Bearing - Lubricate	97
Cooling System Coolant Sample - Obtain	102
Cooling System Coolant Sample - Obtain	102
Differential and Final Drive Oil Sample - Obtain ..	112
Engine Crankcase Breather - Clean	121
Engine Crankcase Breather - Clean	121
Fuel System Secondary Filter - Replace	132
Fuel System Secondary Filter - Replace	133
Fuel Tank Cap and Strainer - Clean	135
Hydraulic System Oil Filter - Replace	139
Steering Pump Outlet Screen - Clean	145
Transmission Oil Filter and Magnetic Screen - Replace/Clean	151
Transmission Oil Filter and Magnetic Screen - Replace/Clean	152

Every 1000 Service Hours or 6 Months

Brake Air System Warning Horn - Test	97
Differential and Final Drive Breather - Clean	109
Rollover Protective Structure (ROPS) - Inspect ..	143
Suction Screen (Transmission Scavenge) - Clean	146

Transmission Breather - Clean	147
Transmission Breather - Clean	147
Transmission Oil - Change	147
Transmission Oil - Change	149
Wheel Coolant Level - Check	155

Every 2000 Service Hours or 1 Year

Brake Shoes and Drums - Inspect/Replace	98
Differential Thrust Pin Clearance - Check	109
Differential and Final Drive Oil - Change	110
Ejector Carrier Rollers - Check/Adjust	114
Ejector Carrier Rollers - Inspect/Pack/Replace ...	114
Ejector Guide Rollers - Check/Adjust	114
Ejector Guide Rollers - Inspect/Pack/Replace	115
Ejector Support Rollers - Check/Adjust	115
Ejector Support Rollers - Inspect/Pack/Replace ..	116
Engine Valve Lash - Check	129
Engine Valve Rotators - Inspect	129
Hitch - Inspect	136
Refrigerant Dryer - Replace	142

Every 3 Years After Date of Installation or Every 5 Years After Date of Manufacture

Seat Belt - Replace	144
---------------------------	-----

Every 3000 Service Hours or 3 Years

Cooling System Pressure Cap - Clean/Replace ..	106
Cooling System Relief Valve - Clean	106
Cooling System Water Temperature Regulator - Replace	107
Crankshaft Vibration Damper - Inspect	107

Every 4000 Service Hours

Hydraulic System Oil - Change	137
-------------------------------------	-----

Every 5000 Service Hours or 3 Years

Turbocharger - Inspect	155
------------------------------	-----

Every 6000 Service Hours or 3 Years

Cooling System Coolant Extender (ELC) - Add ..	105
------------------------------------------------	-----

Every 12 000 Service Hours or 6 Years

Cooling System Coolant (ELC) - Change	103
Cooling System Coolant (ELC) - Change	104

i01823375

Accumulator (Cushion Hitch) - Check

SMCS Code: 5077-535

S/N: 5YR1-Up

S/N: 6TR1-Up

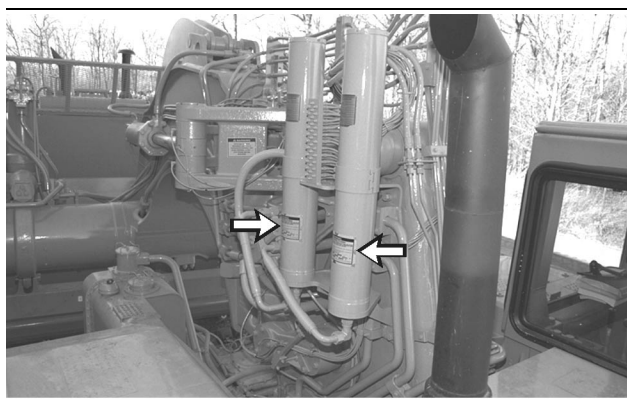


Illustration 152

g00866922

Check the precharge pressure in the cushion-hitch accumulators. Add nitrogen, if necessary. Consult your Caterpillar Dealer for the checking procedure, for the filling procedure, and for the recommended precharge pressure.

i00058661

Air Dryer - Check

SMCS Code: 4285-535

S/N: 5YR1-Up

S/N: 6TR1-Up

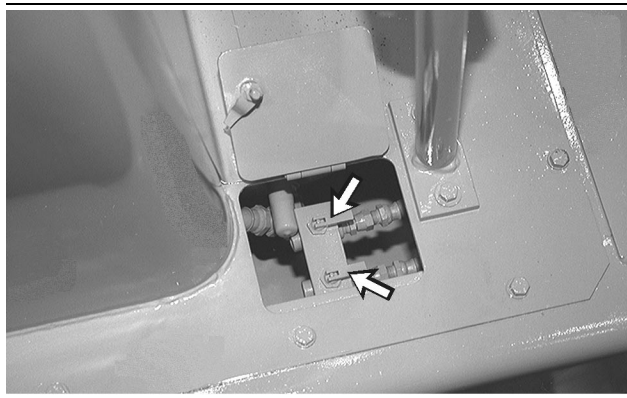


Illustration 153

g00101047

1. Open the drain valve for the air reservoir.

2. Check for moisture in the air reservoirs. Close the drain valve for the air reservoir.

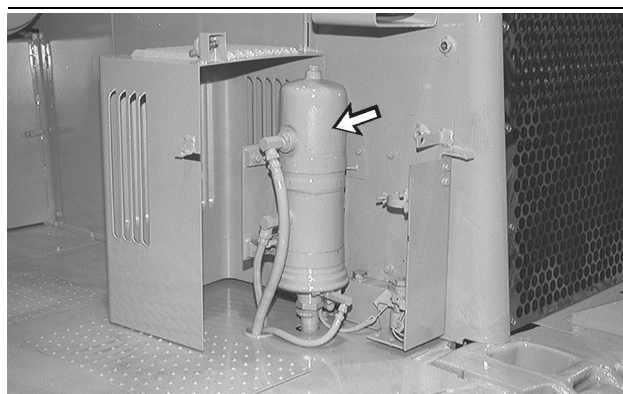


Illustration 154

g00101048

3. If there is moisture in the air reservoirs, replace the air dryer desiccant cartridge or rebuild the desiccant cartridge. Consult your Caterpillar Dealer for information about replacing the air dryer desiccant cartridge and for instructions for rebuilding the air dryer desiccant cartridge.

Note: Small amounts of moisture may be in the system due to condensation in the system. Moisture may also be in the system if an air dryer is installed on a machine that has been operating without an air dryer. Several weeks may be required in order to completely dry the system.

i00058662

Air Dryer Desiccant - Replace

SMCS Code: 4285-510-DSS

S/N: 5YR1-Up

S/N: 6TR1-Up

WARNING

Air lines to and from the air dryer must be at atmospheric pressure. Release the air pressure from the air system completely before performing maintenance.

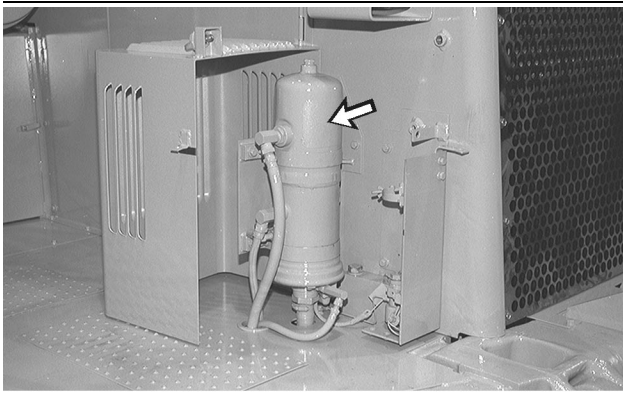


Illustration 155

g00101049

Replace the air dryer desiccant cartridge or rebuild the air dryer desiccant cartridge if water cannot be absorbed. Consult your Caterpillar Dealer for service or for replacement parts.

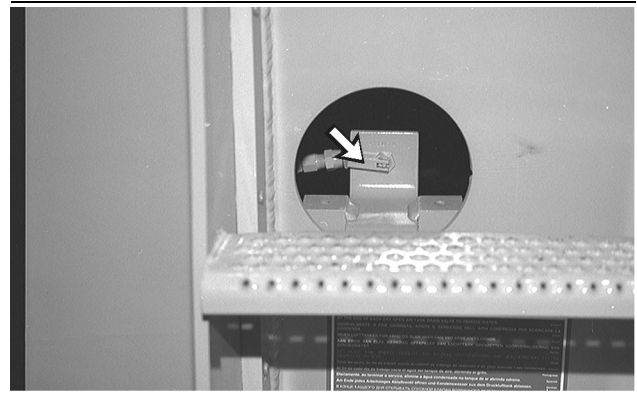


Illustration 157

g00101051

Open the scraper air reservoir drain valve. Allow the moisture and the sediment to drain into a suitable container. Close the scraper air reservoir drain valve.

Air Tank Moisture and Sediment - Drain

i01698110

SMCS Code: 4272-543-M&S

The two tractor air reservoir drain valves are on the right side of the tractor.

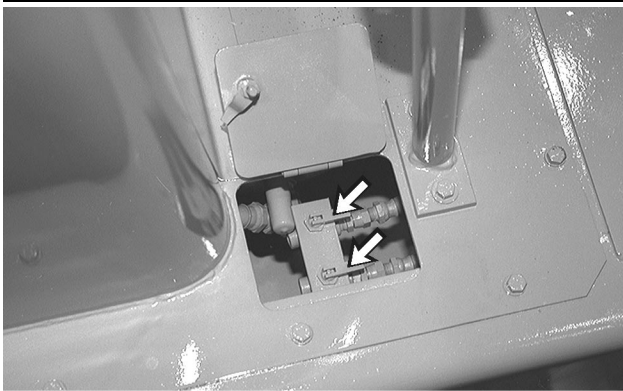


Illustration 156

g00101050

Open the tractor air reservoir drain valves. Allow the moisture and the sediment to drain into a suitable container. Close the tractor air reservoir drain valves.

The scraper air reservoir drain valve is on the right rear side of the scraper.

Backup Alarm - Test

i01349483

SMCS Code: 7406-081

The backup alarm is on the rear of the machine.

Turn the engine start switch to the ON position in order to perform the test.

Apply the service brakes. Move the transmission control lever to the REVERSE position.

The backup alarm should start to sound immediately. The backup alarm will continue to sound until the transmission control lever is moved to the NEUTRAL position or to the FORWARD position.

To adjust the volume level, turn the three-position adjustment knob on the back of the backup alarm. The three-position adjustment knob is set to the HIGH setting when the machine is shipped from the factory. The Three-position adjustment knob should remain at the HIGH setting unless the job site requires a lower volume level.

i01779494

Bail Bearings and Push Plate Spring - Lubricate

SMCS Code: 6262-086; 7115-086-BD

S/N: 5YR1-Up

S/N: 6TR1-Up

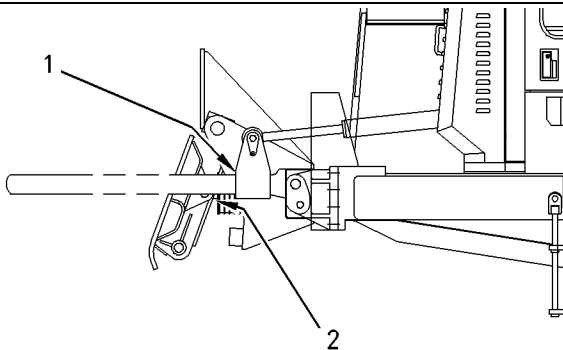


Illustration 158

g00909682

One grease fitting (1) is located on each side of the bail. Grease fitting (2) is located on the spring for the push plate.

The grease fittings for the bearings of the bail and the push plate spring are located at the front of the tractor.

1. Clean the grease fittings.
2. Remove the covers that are on the fittings.
3. Lubricate the three fittings.
4. Replace the covers that are on the fittings.

i01851167

Battery - Clean/Check

SMCS Code: 1401-070; 1401-535; 1402-070; 1402-535

1. Turn the engine start switch to the OFF position. Turn all switches to the OFF position.
2. Turn the battery disconnect switch to the OFF position. Remove the key.
3. At the battery disconnect switch, disconnect the negative battery cable that is connected to the frame.

Note: Do not allow the disconnected battery cable to contact the disconnect switch.

4. Check the battery terminals for corrosion. If corrosion is present, clean the battery terminals with a wire brush.
5. Coat the battery terminals with petroleum jelly, if necessary.
6. Connect the negative battery cable at the battery disconnect switch.
7. Install the key for the battery disconnect switch. Turn the key to the ON position.

i00993589

Battery - Recycle

SMCS Code: 1401-561

Always recycle a battery. Never discard a battery.

Always return used batteries to one of the following locations:

- A battery supplier
- An authorized battery collection facility
- Recycling facility

i01851175

Battery or Battery Cable - Inspect/Replace

SMCS Code: 1401-040; 1401-510; 1402-040; 1402-510

1. Turn the engine start switch to the OFF position. Turn all switches to the OFF position.
2. Turn the battery disconnect switch to the OFF position. Remove the key.
3. At the battery disconnect switch, disconnect the negative battery cable that is connected to the frame.

Note: Do not allow the disconnected battery cable to contact the disconnect switch.

4. Disconnect the negative battery cable from the terminals of the battery.
5. Perform the necessary repairs. Replace the cable or the battery, as needed.
6. Connect the negative battery cable to the terminals of the battery.

7. Connect the negative battery cable at the battery disconnect switch.
8. Install the key for the battery disconnect switch. Turn the key to the ON position.

i01698702

Belt - Inspect/Adjust/Replace

SMCS Code: 1357-025; 1357-040; 1357-510;
1397-025; 1397-040; 1397-510

Inspect the belts for cracks. Inspect the belts for missing pieces. Inspect the belts for frayed areas. Inspect the belts for wear. A worn belt will ride in the bottom of the pulley. Replace the belts if any of these conditions exist. Replace the belts if the belts are stretched beyond the limits of the adjuster.

Note: If new belts are installed, recheck the belt adjustment after 30 minutes of operation. If two belts or more are required for an application, replace the belts in belt sets that are matched. If only one belt of a matched set needs replacement, replace all of the belts in the set. Belts of the same part number are not necessarily matched belts.

Fan Drive Belts

Note: The fan drive belts for the scraper are adjusted in the same manner as the tractor.

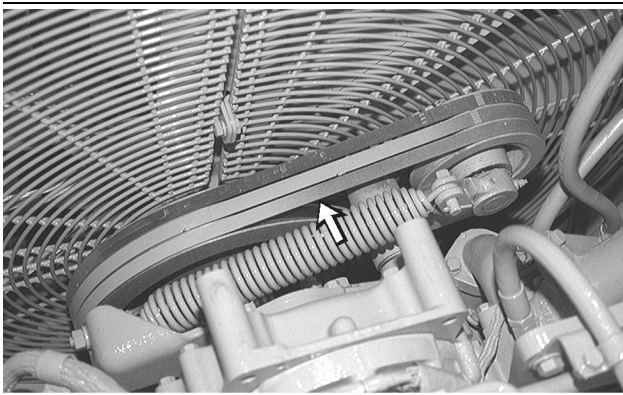


Illustration 159

g00101052

The fan drive belts are located in the engine compartment of the tractor. Open the access door on the right side of the engine in order to inspect the fan drive belts. The fan drive belts run on a pulley that is spring loaded. There is no adjustment for the pulley that is spring loaded. Replace the belts if the belts are worn or if the belts are damaged.

Alternator Belt

Note: The alternator belt for the scraper is adjusted in the same manner as the tractor.

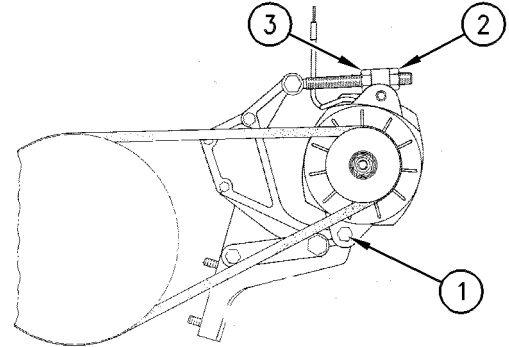


Illustration 160

g00101053

1. To adjust the alternator belt, loosen the alternator mounting bolt (1). Loosen the adjusting locknut (2).
2. Turn the adjusting nut (3) until the correct belt tension is reached. Tighten the adjusting locknut (2) to the proper torque. Refer to Specifications, "Alternator Belt Tightner" for your machine.
3. Tighten the alternator mounting bolt (1).
4. If new belts are installed, check the belt adjustment again after 30 minutes of engine operation at the rated speed.

Air Conditioner Belt

WARNING

Inhaling air conditioner refrigerant gas through a lit cigarette or other smoking method or inhaling fumes released from a flame contacting air conditioner refrigerant gas can cause bodily harm or death. Do not smoke when servicing air conditioners or wherever air conditioner refrigerant gas may be present.

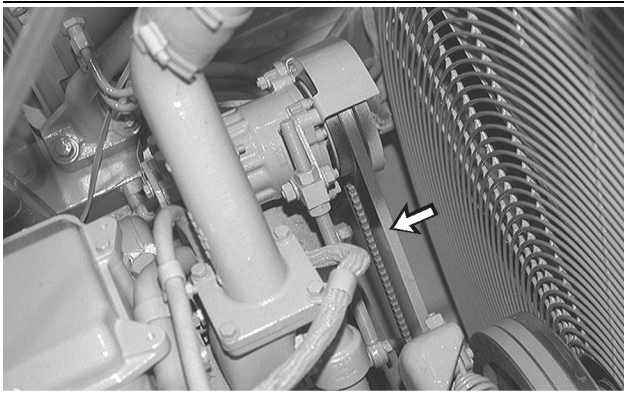


Illustration 161

g00101037

1. Inspect the condition of the compressor drive belt. If the compressor drive belt is worn or the compressor drive belt is cracking replace the compressor drive belt. Check the tension on the belt. Refer to Specifications, "Belt Tension Chart" for your engine. If the belt deflection is not within the correct dimensions, continue to Step 2. If the belt deflection is correct go to Step 6.

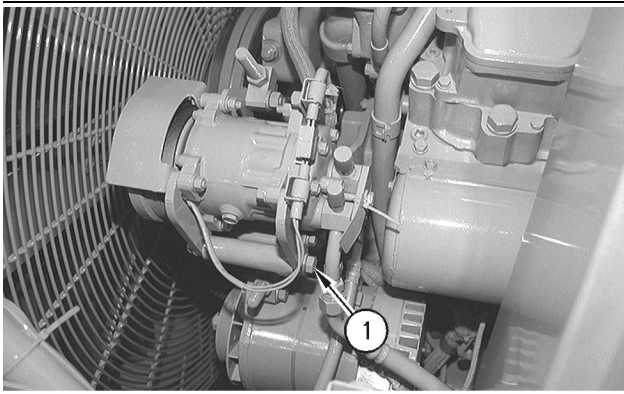


Illustration 162

g00101038

2. Loosen the compressor mounting bolt (1).

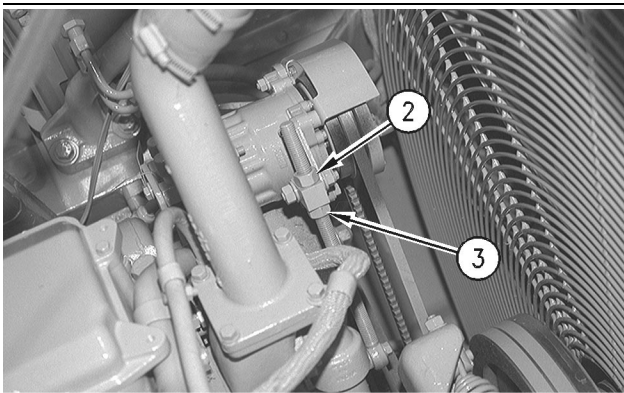


Illustration 163

g00101041

3. Loosen the compressor locknut (2).

4. Turn the adjusting nut (3) until the correct belt tension is reached. Refer to Specifications, "Belt Tension Chart" for your engine. Tighten the compressor locknut (2) in the same manner as the alternator. Refer to Specifications, "Alternator Belt Tightner" for your machine.
5. Tighten the compressor mounting bolt (1).
6. If poor cooling is experienced, turn off the air conditioner. Stop the engine. Consult your Caterpillar Dealer for air conditioner system service.

i00058707

Bowl Lift Cylinder Bearings - Lubricate

SMCS Code: 5303-086-BD

Wipe the fittings before you apply lubricant to the fittings.

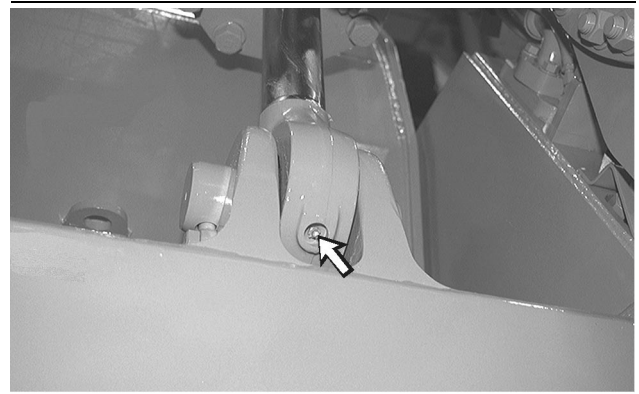


Illustration 164

g00101090

Apply grease to one fitting for each of the bearings on the bowl lift cylinder. Each side of the bowl has one fitting.

There are a total of two fittings.

i01699405

Brake Air System Pressure - Test

SMCS Code: 4250-081-PX

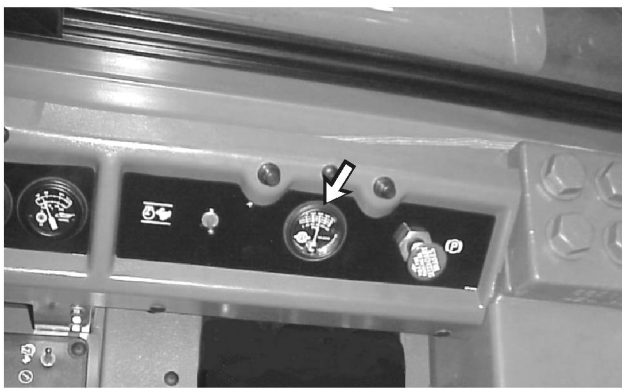


Illustration 165

g00874881

1. Start the engine and look at the air pressure gauge. Allow the brake system air pressure to reach 850 ± 50 kPa (125 ± 10 psi).

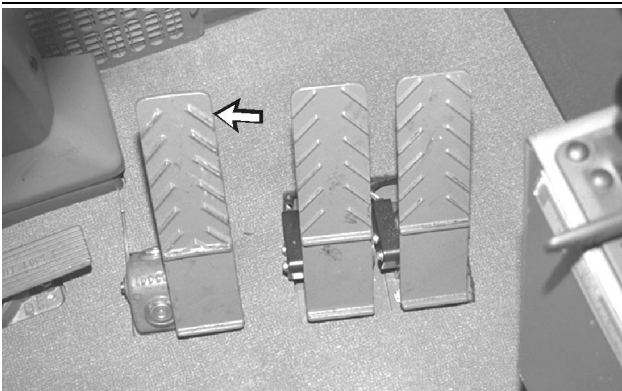


Illustration 166

g00872910

2. Apply the service brake control and hold down the service brake control.
3. Stop the engine.
4. The reading on the air pressure gauge should not drop more than 35 kPa (5 psi) after the engine is stopped for 10 minutes. Repair the brakes, if necessary.

i00768566

Brake Air System Warning Horn - Test

SMCS Code: 7402-081; 7408-081

The warning horn for the air brake system should sound when the air pressure gauge shows a reading below 450 kPa (65 psi).

1. The parking brake should be in the ENGAGED position.
2. The lever for the transmission control should be in the NEUTRAL (N) position.
3. Start the engine.
4. Watch the air pressure gauge. The air pressure must be above 450 kPa (65 psi).
5. Purge air from the air tanks by doing the following procedure:
 - Engage and disengage the service brake until the air pressure drops below 450 kPa (65 psi).

The warning horn should sound. Make repairs if the horn is not sounding.

i01699565

Brake Camshaft Bearing - Lubricate

SMCS Code: 4251-086-BD

Wipe all of the fittings before you apply lubricant through the fittings.



Illustration 167

g00874965

i01699587

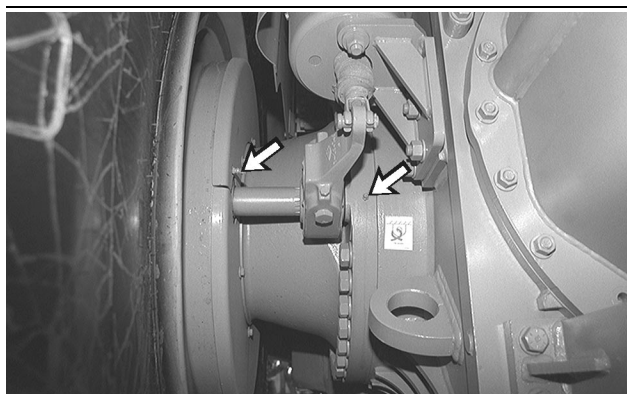


Illustration 168

g00101615

Apply lubricant through the two fittings on the inside of each tractor wheel.

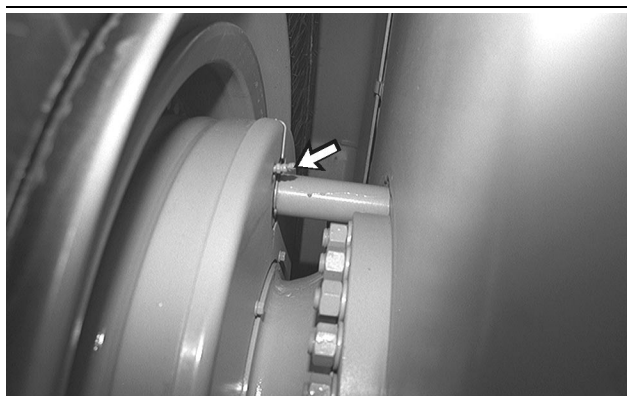


Illustration 169

g00101617

Apply lubricant through one fitting on each scraper wheel.

There is a total of six fittings.

Brake Shoes and Drums - Inspect/Replace

SMCS Code: 4252-040; 4252-510; 4253-040; 4253-510



Illustration 170

g00874965

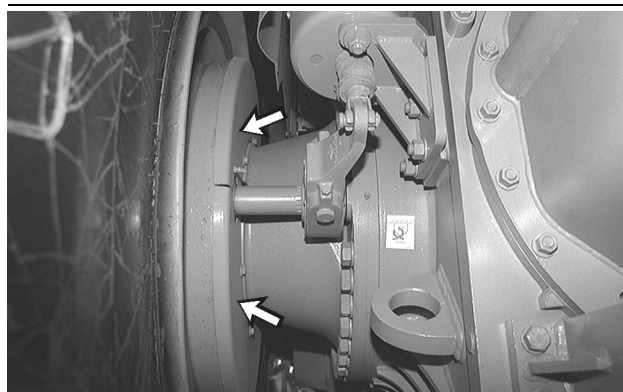


Illustration 171

g00101626

1. Remove the wheel brake dust cover.
2. Check the brake shoes for wear or for damage. Measure the thickness of the brake linings. If the thickness of the brake linings is less than 7.2 mm (.28 inch), replace the brake linings.
3. Check the brake drum for wear or for damage. Repair the brake drum or replace the brake drum, if necessary.
4. Install the wheel brake dust cover.

i01349518

Brakes, Indicators and Gauges - Test

SMCS Code: 4251-081; 4267-081; 7000; 7450-081; 7490-081

Before you operate the machine, perform the following checks and make any necessary repairs.

- Look for broken lenses on the gauges, broken indicator lights, broken switches, and other broken components in the cab.
- Start the engine.
- Look for inoperative gauges.
- Turn on all machine lights. Check for proper operation.
- Sound the forward horn.
- Move the machine forward and test the service brakes. If the service brakes malfunction, consult your Caterpillar Dealer for repairs.
- Engage the parking brake. Move the machine forward in order to test the parking brake. If the parking brake malfunctions, consult your Caterpillar Dealer for repairs.
- Stop the engine.

i01699620

Braking System - Test

SMCS Code: 4251-081; 4267-081

Service Brake Holding Ability Test

WARNING

Personal injury can result if the machine moves while testing.

If the machine begins to move during test, reduce the engine speed immediately and engage the parking brake.

NOTICE

If the machine moved while testing the brakes, contact your Caterpillar Dealer. Have the dealer inspect and, if necessary, repair the service brakes before returning the machine to operation.

Make sure that the area around the machine is clear of personnel and of obstacles.

Test the brakes on a dry, level surface.

Fasten the seat belt before you test the brakes.

The service brake holding ability test determines whether the service brake is functional. This test is not intended to measure the maximum brake holding effort. The brake holding effort that is required to hold a machine at a specific engine rpm will be different for various machines. This is due to variances in the engine setting, in the power train efficiency, and in the brake holding ability.

When the machine begins to move, the engine rpm should be compared to a prior test. Use the comparison as an indication of system deterioration.

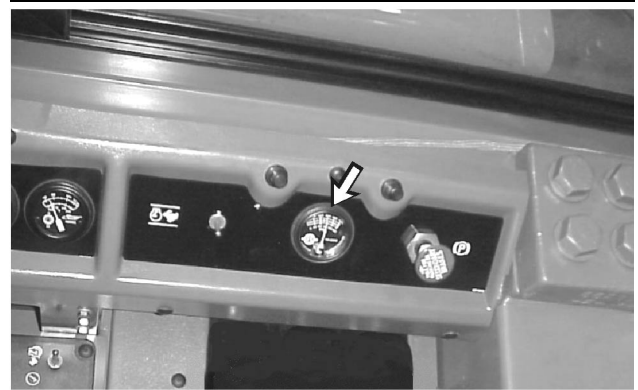


Illustration 172

g00874881

1. Start the engine and look at the air pressure gauge. Allow the brake system air pressure to reach 850 ± 50 kPa (125 ± 10 psi).
2. Raise the bowl slightly.
3. Apply the service brake and release the parking brake.
4. While the service brake is applied, move the transmission direction and speed control to second speed.
5. Gradually increase the engine rpm. The service brake should prevent machine movement when the engine is running at 1500 ± 100 rpm.

The engine rpm should be 1500 ± 100 rpm or more. Record the actual engine rpm that is achieved during the test for future comparisons.

If the engine rpm is less than 1400 rpm, consult your Caterpillar Dealer for an inspection of the machine and for repairs for the machine.

6. Reduce the engine speed to low idle and move the transmission direction and speed control to the NEUTRAL position. Engage the parking brake. Lower the bowl to the ground and stop the engine.

Note: If the friction material for the brakes needs to be replaced, the new friction material may require burnishing for maximum performance. Consult your Caterpillar dealer for the procedure for burnishing.

Parking And Secondary Brake Holding Ability Test

WARNING

If the machine begins to move, reduce the engine speed immediately and engage the parking brake.

NOTICE

If the machine moved while testing the brakes, contact your Caterpillar Dealer. Have the dealer inspect and, if necessary, repair the service brakes before returning the machine to operation.

Make sure that no people or obstacles are in the area around the machine.

Test the brakes on a dry, level surface.

Fasten the seat belt before you test the brakes.

This test is not intended to measure the maximum brake holding effort. The brake holding effort that is required to hold a machine at a specific engine rpm will be different for various machines. This is due to variances in the engine setting, in the power train efficiency, and in the brake holding ability.

When the machine begins to move, the engine rpm should be compared to a prior test. Use the comparison as an indication of system deterioration.

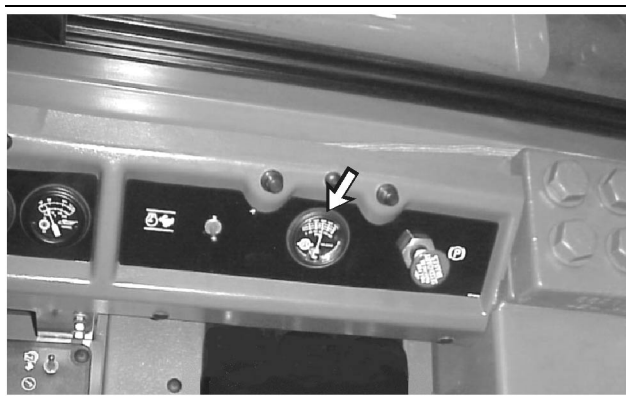


Illustration 173

g00874881

1. Start the engine and look at the air pressure gauge. Allow the brake system air pressure to reach 850 ± 50 kPa (125 ± 10 psi).

2. Raise the bowl slightly.

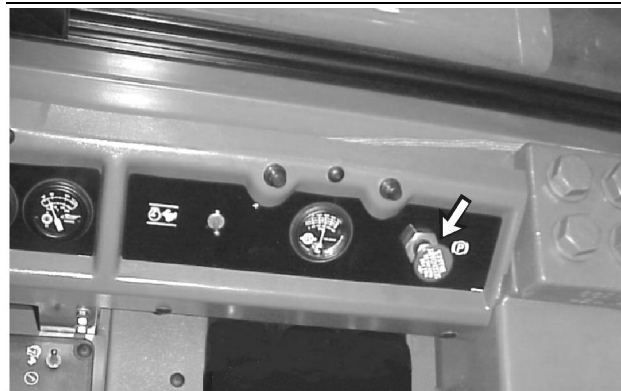


Illustration 174

g00872565

3. While the parking brake is applied, move the transmission direction and speed control to second speed.



Illustration 175

g00870481

4. Gradually increase the engine speed to high idle. The machine should not move when the engine rpm is at 1000 ± 100 rpm.

The engine rpm should be 1000 ± 100 rpm or more. Record the actual engine rpm that is achieved during the test for future comparisons.

If the engine rpm is less than 900 rpm, consult your Caterpillar Dealer for an inspection of the machine and for repairs of the machine.

5. Reduce the engine speed and move the transmission direction and speed control to the NEUTRAL position. Lower the bowl to the ground and stop the engine.

Note: If the friction material for the brakes needs to be replaced, the new friction material may require burnishing for maximum performance. Consult your Caterpillar Dealer or see Special Instruction, SEHS9580 for the procedure for burnishing.

i01699720

Cab Air Filter - Clean/Replace

SMCS Code: 7342-070; 7342-510

Cleaning the Filters

Outside Filters

Note: Clean the air filters more often during dusty conditions.

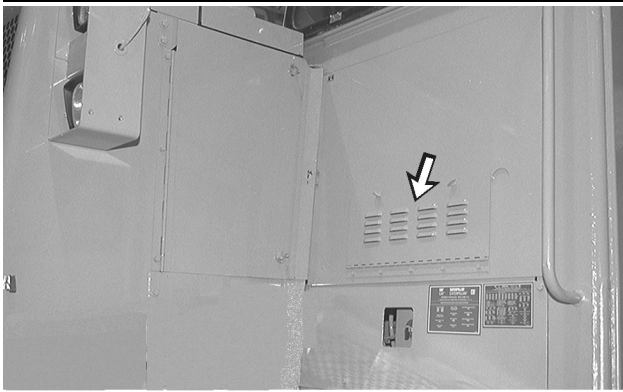


Illustration 176

g00101782

1. Open the access cover. The access cover is on the front of the cab.

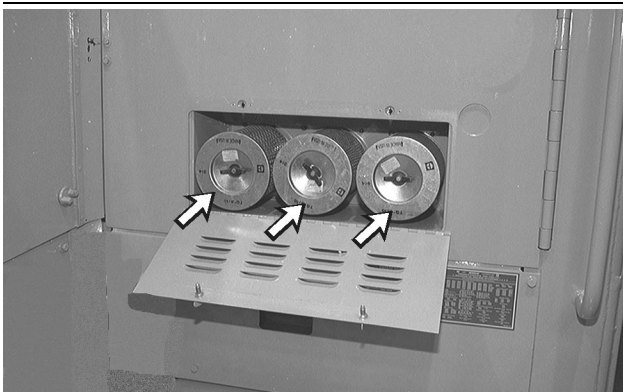


Illustration 177

g00101783

2. Remove the filter elements. Clean the filter elements with pressure air or wash the filter elements in warm water. Use a nonsudsing household detergent.

3. After you clean the filter element, inspect the filter element. Do not use a filter element with damaged pleats, a damaged gasket or damaged seals.
4. Rinse the filter elements in clean water and air dry the filter elements thoroughly.
5. Install the filter elements. Close the access cover.

Inside Filter

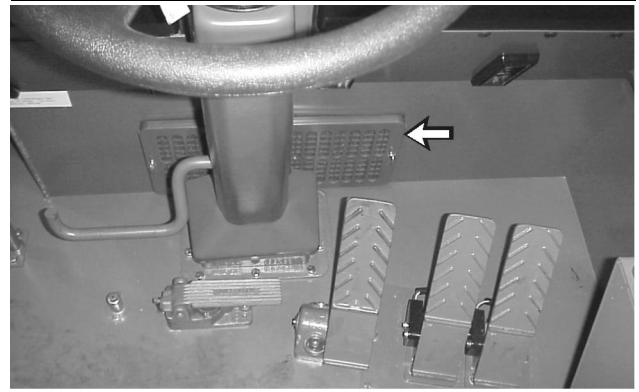


Illustration 178

g00875098

1. Remove the access cover. The access cover is on the inside of the cab.
2. Remove the filter element. Clean the filter element with pressure air or wash the filter element in warm water. Use a nonsudsing household detergent.
3. After you clean the filter element, inspect the filter element. Do not use a filter element with damaged pleats, a damaged gasket or damaged seals.
4. Rinse the filter element in clean water and air dry thoroughly.
5. Install the filter element. Install the access cover.

i01699848

Circuit Breakers - Reset

SMCS Code: 1420-529

S/N: 5YR1-Up

S/N: 6TR1-Up

Circuit Breaker Reset – Push in the button in order to reset the circuit breaker. If the electrical system is working properly, the button will remain depressed. If the button does not remain depressed, check the appropriate electrical circuit. Repair the electrical circuit, if necessary.

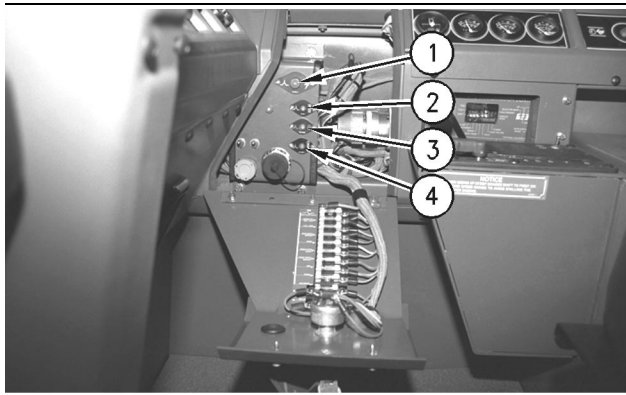


Illustration 179

g00875164



Alternator (1) – 80 AMP



Blower Motor (2) – 15 AMP



Engine Control (3) – 15 AMP



Key Switch (4) – 10 AMP

i01925441

Cooling System Coolant Sample - Obtain

SMCS Code: 1395-554

S/N: 5YR1-Up

S/N: 6TR1-Up

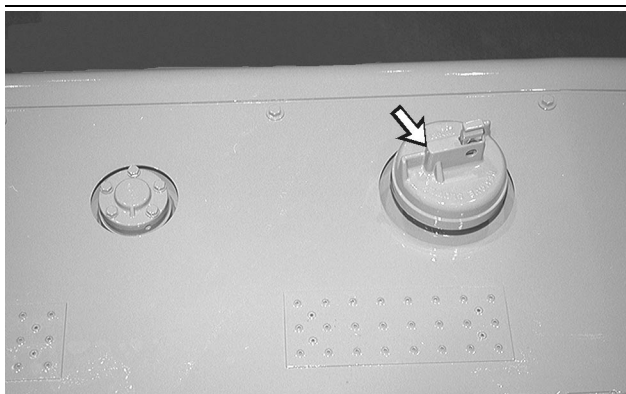


Illustration 180

g00102060

The cooling system is not equipped with a sampling valve. Obtaining a sample of the cooling system will require a vacuum pump or an equivalent. Withdraw the fluid through the cooling system pressure cap.

For additional information about coolant analysis, refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" or consult your Caterpillar dealer.

i01925448

Cooling System Coolant Sample - Obtain

SMCS Code: 1395-554

S/N: 6PR1-Up

S/N: 7KR1-Up

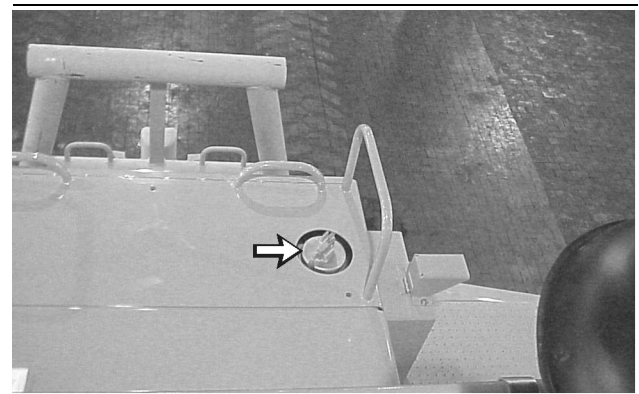


Illustration 181

g00875297

The cooling system is not equipped with a sampling valve. Obtaining a sample of the cooling system will require a vacuum pump or an equivalent. Withdraw the fluid through the cooling system pressure cap.

For additional information about coolant analysis, refer to Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations" or consult your Caterpillar dealer.

i01925972

Cooling System Coolant (ELC) - Change

SMCS Code: 1350-044-NL

S/N: 5YR1-Up

S/N: 6TR1-Up

NOTICE

Do not change the coolant until you read and understand the cooling system information in Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations".

Failure to do so could result in damage to the cooling system components.

NOTICE

Mixing ELC with other products reduces the effectiveness of the coolant and shortens coolant life. Use only Caterpillar products or commercial products that have passed the Caterpillar EC-1 specifications for premixed or concentrate coolants. Use only Caterpillar Extender with Caterpillar ELC. Failure to follow these recommendations could result in the damage to cooling systems components.

If ELC cooling system contamination occurs see the topic Extended Life Coolant (ELC) in the Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations".

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

If the coolant in the machine is changed to Extended Life Coolant from another type of coolant, see Special Publication, SEBU6250, "Extended Life Coolant (ELC)".

1. Allow the engine to cool.

2. Loosen the pressure cap slowly in order to release pressure. Remove the pressure cap.



Illustration 182

g00102061

3. Radiator drain (1) is located under the right side of the tractor.
4. Remove bolt (2) in order to remove the cover plate for the radiator drain. Open the drain valve.
5. Flush the cooling system with clean water until the draining water is transparent.
6. Close the drain valve. Install the cover plate and the bolt.
7. Add the Extended Life Coolant. Refer to the following topics:
- Operation and Maintenance Manual, SEBU6250, "Cooling System Specifications"
 - Operation and Maintenance Manual, "Capacities (Refill)"
8. Start the engine. Operate the engine without the cooling system pressure cap until the water temperature regulator opens and the coolant level stabilizes.
9. Maintain the coolant level at the bottom of the filler pipe so that the sight gauge is completely covered.
10. Inspect the gasket of the cooling system pressure cap. If the gasket is damaged, replace the gasket.
11. Install the cooling system pressure cap.
12. Stop the engine.

i01922356

Cooling System Coolant (ELC) - Change

SMCS Code: 1350-044-NL

S/N: 6PR1-Up

S/N: 7KR1-Up

NOTICE

Do not change the coolant until you read and understand the cooling system information in Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations".

Failure to do so could result in damage to the cooling system components.

NOTICE

Mixing ELC with other products reduces the effectiveness of the coolant and shortens coolant life. Use only Caterpillar products or commercial products that have passed the Caterpillar EC-1 specifications for premixed or concentrate coolants. Use only Caterpillar Extender with Caterpillar ELC. Failure to follow these recommendations could result in the damage to cooling systems components.

If ELC cooling system contamination occurs see the topic Extended Life Coolant (ELC) in the Special Publication, SEBU6250, "Caterpillar Machine Fluids Recommendations".

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

If the coolant in the machine is changed to Extended Life Coolant from another type of coolant, see Special Publication, SEBU6250, "Extended Life Coolant (ELC)".

1. Allow the engine to cool.

2. Loosen the pressure cap slowly in order to release pressure. Remove the pressure cap.

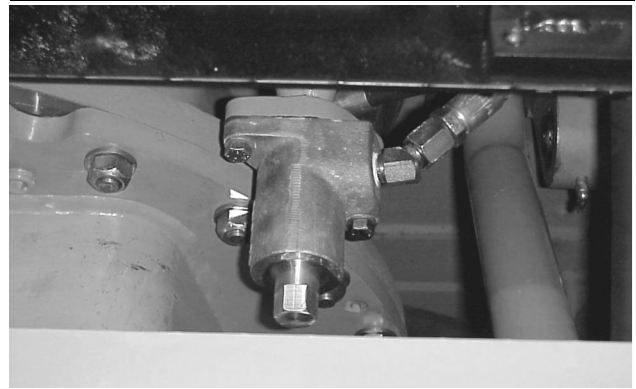


Illustration 183

g00878952

3. Radiator drain (1) is located under the right side of the tractor.

4. Remove bolt (2) in order to remove the cover plate for the radiator drain. Open the drain valve.

5. Flush the cooling system with clean water until the draining water is transparent.

6. Close the drain valve. Install the cover plate and the bolt.

7. Add the Extended Life Coolant. Refer to Operation and Maintenance Manual, "Capacities (Refill)".

8. Start the engine. Operate the engine without the cooling system pressure cap until the water temperature regulator opens and the coolant level stabilizes.

9. Maintain the coolant level at the bottom of the filler pipe so that the sight gauge is completely covered.

10. Inspect the gasket of the cooling system pressure cap. If the gasket is damaged, replace the gasket.

11. Install the cooling system pressure cap.

12. Stop the engine.

i01921796

Cooling System Coolant Extender (ELC) - Add

SMCS Code: 1352-544-NL

When a Caterpillar Extended Life Coolant (ELC) is used, an extender must be added to the cooling system. See the Operation and Maintenance Manual, "Maintenance Interval Schedule" for the proper service interval. The amount of extender is determined by the cooling system capacity.

Table 7

Amount of Caterpillar Extender (ELC)	
Cooling System Capacity	Recommended Amount of Caterpillar Extender
22 to 30 L (6 to 8 US gal)	0.57 L (20 oz)
31 to 38 L (8 to 10 US gal)	0.71 L (24 oz)
39 to 49 L (10 to 13 US gal)	0.95 L (32 oz)
50 to 64 L (13 to 17 US gal)	1.18 L (40 oz)
65 to 83 L (17 to 22 US gal)	1.60 L (54 oz)
84 to 114 L (22 to 30 US gal)	2.15 L (72 oz)
115 to 163 L (30 to 43 US gal)	3.00 L (100 oz)
164 to 242 L (43 to 64 US gal)	4.40 L (148 oz)

Note: For cooling systems with larger capacities, use the formula in Table 8 in order to determine the correct amount of extender.

Table 8

Calculation of ELC Extender
$V^{(1)} \times 0.02 = X^{(2)}$

- (1) V is the total volume of the cooling system.
(2) X is the amount of ELC Extender that is required.

For additional information about adding an extender, see Special Publication, SEBU6250, "Extended Life Coolant (ELC)" or consult your Caterpillar Dealer.

i01924947

Cooling System Coolant Level - Check

SMCS Code: 1350-535-FLV

The cooling system pressure cap is located on the top of the hood at the front of the machine.

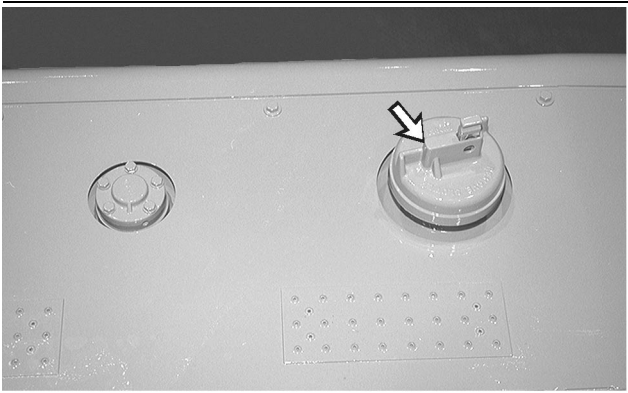


Illustration 184
Tractor

g00102062

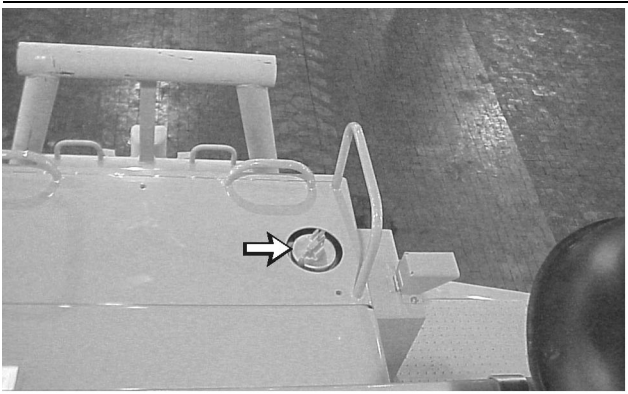


Illustration 185
Scraper

g00875297

1. Remove the cooling system pressure cap slowly in order to relieve the pressure.
2. Maintain the coolant level at 13 mm (.5 inch) from the bottom of the filler pipe. If it is necessary to add coolant daily, check the system for leaks.
3. If additional coolant is necessary, remove the cooling system pressure cap and add the appropriate coolant mixture. Install the pressure cap.

i01700466

Cooling System Pressure Cap - Clean/Replace

SMCS Code: 1382-070; 1382-510

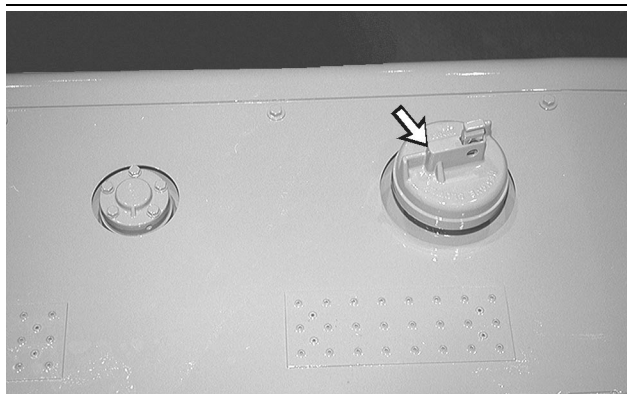


Illustration 186

g00102069

Tractor

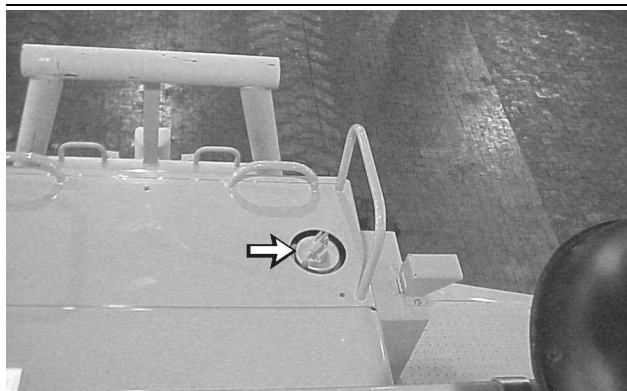


Illustration 187

g00875297

Scraper

1. Remove the cooling system pressure cap slowly in order to relieve the pressure.
2. Inspect the cap for damage, for foreign material, and for deposits.
3. Clean the cap with a clean cloth or replace the cap, if necessary.
4. Inspect the condition of the gasket in the cap. Replace the gasket, if necessary.
5. Install the pressure cap.

i01700532

Cooling System Relief Valve - Clean

SMCS Code: 1370-070

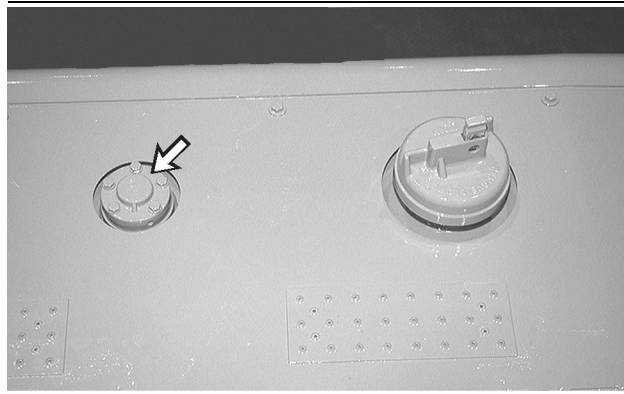


Illustration 188

g00102094

Tractor

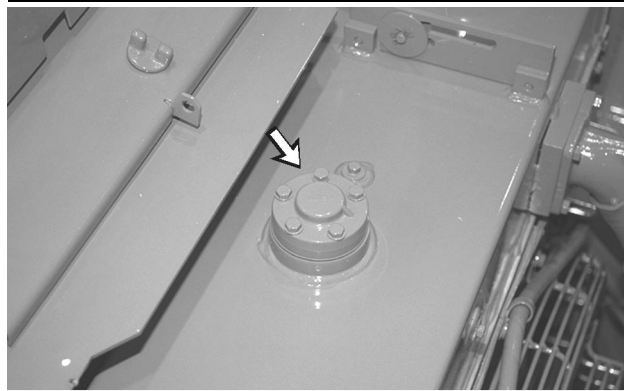


Illustration 189

g00878974

Scraper

The cooling system relief valve is located on the top of the hood at the front of the machine.

1. Remove the cooling system pressure cap slowly in order to relieve the pressure.

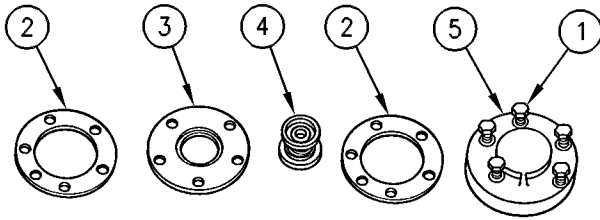


Illustration 190

g00102095

2. Remove the mounting bolts (1). Remove the cover (5), gaskets (2), plate (3) and valve assembly (4).
3. Inspect the valve assembly (4), plate (3), and gaskets (2). Replace any of these components, if necessary.
4. Inspect valve cover (5) and mounting bolts (1).
5. Inspect the components for damage and for foreign matter. Replace the valve assembly if the valve assembly is damaged.
6. Install the valve assembly (4). Install the plate (3), gaskets (2), cover (5) and the mounting bolts (1).
7. Maintain the coolant level within 13 mm (.5 inch) of the bottom of the filler pipe.
8. Install the cooling system pressure cap.

i01700613

Cooling System Water Temperature Regulator - Replace

SMCS Code: 1355-510

NOTICE

Failure to replace the engine's water temperature regulator on a regularly scheduled basis could cause severe engine damage.

NOTICE

The water temperature regulators may be reused if the water temperature regulators are within test specifications, are not damaged, and do not have excessive buildup of deposits.

NOTICE

Since Caterpillar engines incorporate a shunt design cooling system, it is mandatory to always operate the engine with a water temperature regulator.

Depending on load, failure to operate with a water temperature regulator could result in either an overheating or an overcooling condition.

NOTICE

If the water temperature regulator is installed incorrectly, it will cause the engine to overheat.

Replace the water temperature regulator on a regular basis. Regular replacement of the temperature regulator will reduce the chance of down time due to problems with the cooling system.

The water temperature regulator should be replaced after the cooling system has been cleaned. Replace the water temperature regulator while the cooling system level is below the housing assembly.

1. Loosen the hose clamp and remove the hose from the elbow. Disconnect the hose assembly from the water temperature regulator housing.
2. Remove the bolts from the elbow. Remove the elbow and the water temperature regulator housing.
3. Remove the gasket, the water temperature regulator, and the seal from the water temperature regulator housing.
4. Install a new seal in the water temperature regulator housing. Install a new water temperature regulator and a new gasket. Install the water temperature regulator housing on the engine cylinder head.
5. Install the elbow and the hose. Tighten the hose clamp.

i01693168

Crankshaft Vibration Damper - Inspect

SMCS Code: 1205-040

Damage to the vibration damper or failure of the vibration damper will increase torsional vibrations. These vibrations will result in damage to the crankshaft and to the other engine components. A deteriorating vibration damper will cause excessive gear train noise at variable points in the speed range.

Caterpillar recommends replacing the vibration damper for any of the following reasons:

- The engine has had a failure because of a broken crankshaft.
- The S-O-S analysis detected a worn crankshaft front bearing.
- The S-O-S analysis detected a large amount of gear train wear that is not caused by a lack of oil.

The vibration damper can be used again if none of the above conditions are found or if the vibration damper is not damaged.

In the vibration damper, a wobble can occur on the outer ring. Some of the wobble of the outer ring is normal. If a wobble is present, replacement of the vibration damper may not be necessary. To confirm an acceptable wobble, see the Service Manual for the procedure to check the vibration damper.

Marks of the vibration damper are on the hub and on the outer ring. These marks will indicate the condition of the vibration damper. If the marks are not in alignment, the rubber seal between the outer ring and the hub has separated from the outer ring or from the hub. Install a new vibration damper if the marks are not in alignment.

Note: Contact your Caterpillar dealer for further information.

i01922370

Cutting Edges and End Bits - Inspect/Replace

SMCS Code: 6801-040; 6801-510; 6804-040; 6804-510

S/N: 6PR1-Up

S/N: 7KR1-Up

WARNING

Personal injury or death can result, if the bowl is not blocked up. Block the bowl before changing cutting edge.

NOTICE

Do not attempt to increase wear life by welding on cutting edges. This may result in premature failures.

Change or rotate the cutting edges or router bits, before the mounting surfaces become worn.

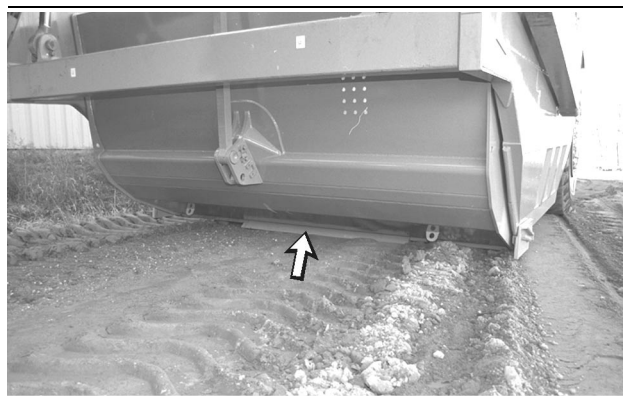


Illustration 191

g00875806

1. Raise the bowl and block up the bowl. Only block up the bowl to a sufficient height for the removal of the cutting edges.

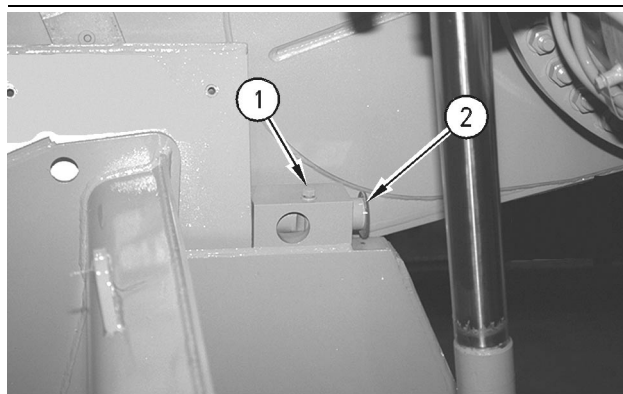


Illustration 192

g00102101

2. Remove the bolt (1) and pin assembly (2).

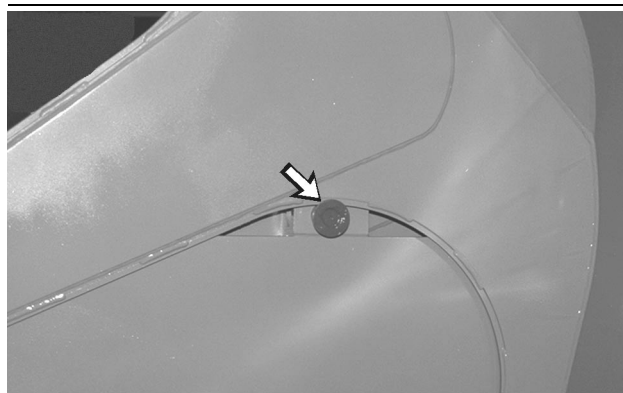


Illustration 193

g00102104

3. Raise the apron high enough so that the apron passes over the pin holder.
4. Install the pin assembly.
5. Lower the apron until the apron is resting on the pin assembly.

i01704843



Illustration 194

g00102105

6. Remove the bolts from the cutting edges. Then remove the cutting edges.
7. Clean the contact surfaces.
8. Rotate the cutting edges. If the opposite sides of the cutting edges are not worn, install the opposite sides of the cutting edges outward.

Note: The cutting edges on the ends can be moved from one side of the machine to the other side of the machine if the cutting edges are not worn.

9. Install new cutting edge sections if the cutting edges are worn on both sides.
10. Install the bolts for the cutting edges and tighten the bolts to the specified torque. Refer to Specifications, SENR3130, "Torque Specification".
11. Raise the apron and remove the pin assembly from the pin holder. Lower the apron and return the pin assembly to the pin's storage location.
12. Raise the bowl and remove the blocking. Lower the bowl to the ground.
13. After a few hours of operation, check the bolts for proper torque. Tighten the bolts, if necessary.

Differential Thrust Pin Clearance - Check

SMCS Code: 3258-535-T9

S/N: 5YR1-Up

S/N: 6TR1-Up



Illustration 195

g00102131

Refer to the Service Manual for the correct procedure to adjust the differential thrust pin or contact your Caterpillar Dealer.

i01700882

Differential and Final Drive Breather - Clean

SMCS Code: 3258-070-BRE; 4050-070-BRE

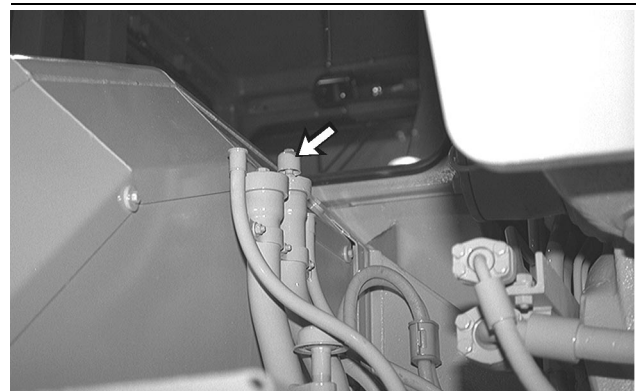


Illustration 196

g00102106

Tractor

1. The differential and final drive breather is located on the left side of the transmission at the rear of the tractor.

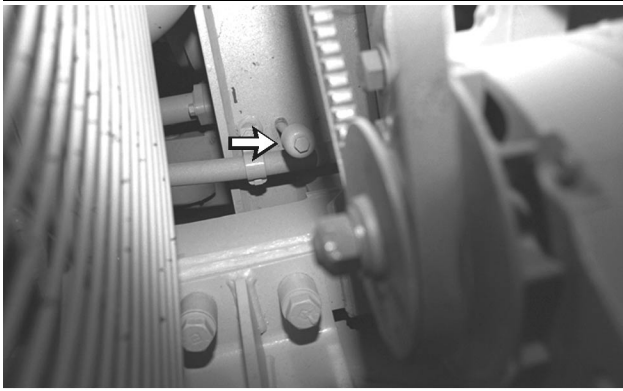


Illustration 197
Scraper

g00875921

2. The differential and final drive breather is located on the transmission for the scraper .
3. Remove the differential and final drive breather.
4. Wash the breather in clean, nonflammable solvent.
5. Allow the breather to dry.
6. Install the breather.

i01700953

Differential and Final Drive Oil - Change

SMCS Code: 3258-044; 4050-044

Wipe the openings around the covers and the surfaces before you fill the differential and final drives.



Illustration 198

g00879363



Illustration 199

g00102114

1. Remove the differential drain plug for the tractor and remove the differential drain plug for the scraper. Drain the oil into a suitable container.

Note: Always discard drained fluids according to local regulations.



Illustration 200

g00102117

2. Position each tractor wheel so that the drain plug on each wheel is at the lowest point. Remove the drain plugs and allow the oil to drain into a suitable container.
3. Clean the drain plugs and install the drain plugs.

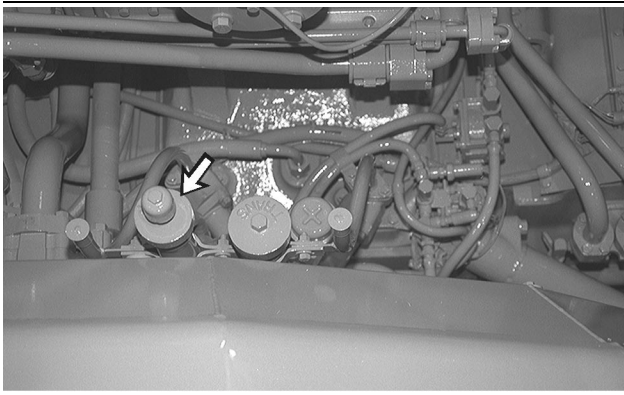


Illustration 201
Tractor

g00102116

8. Clean the filler cap and install the filler cap.

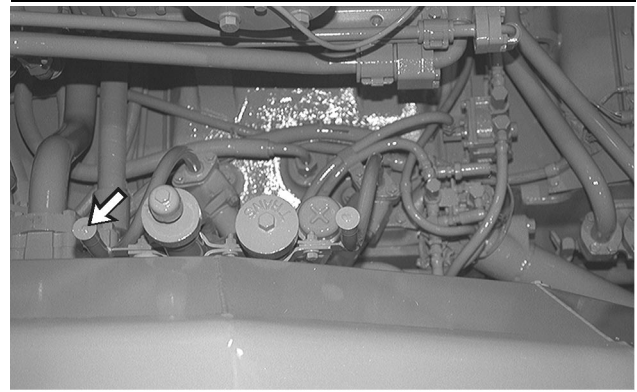


Illustration 204
Tractor

g00102118

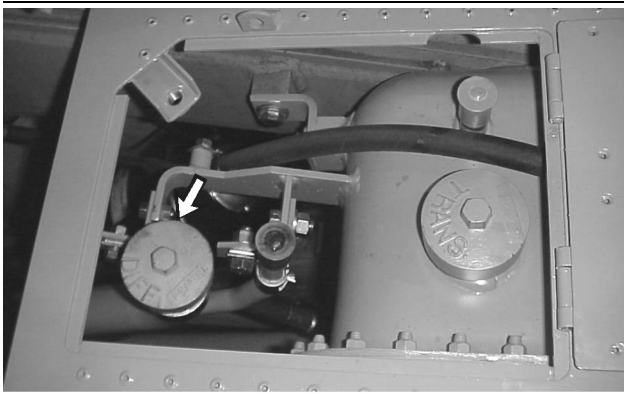


Illustration 202
Scraper

g00875980

4. Remove the filler cap.

5. Fill the differentials and the final drives. See Operation and Maintenance Manual, "Capacities (Refill)".

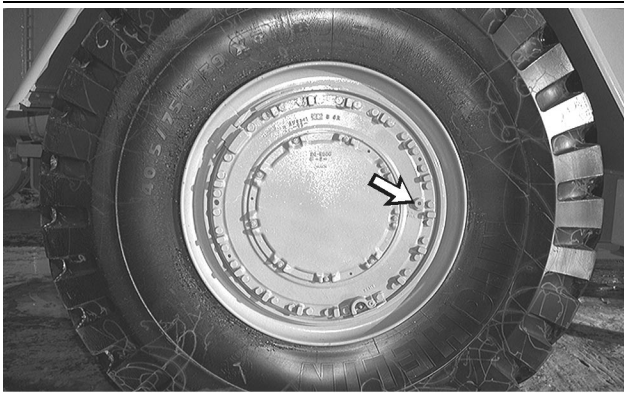


Illustration 203

g00102117

6. Position each tractor wheel so that the filler plug on each wheel is in the correct position. Remove the filler plugs. Fill the final drives.

7. Clean the filler plug. Install the filler plug.

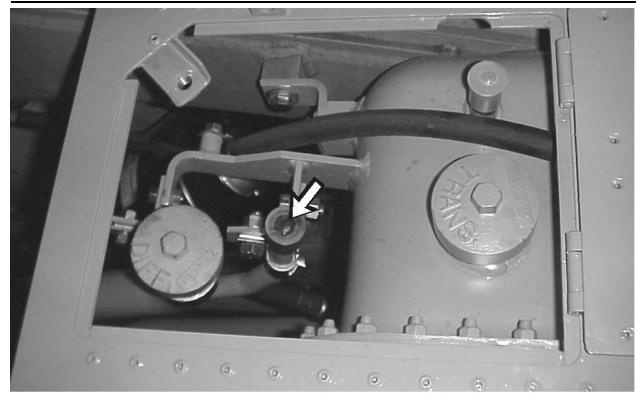


Illustration 205
Scraper

g00875979

9. Maintain the differential oil level between the marks on the dipstick.

i01701033

Differential and Final Drive Oil Level - Check

SMCS Code: 3258-535-FLV; 4050-535-FLV

Clean covers and surfaces around any openings before you add oil.



Illustration 206

g00876011

The oil level dipstick for the differential and for the final drive is on the left rear side of the tractor.

The oil level dipstick for the differential and for the final drive is on the rear of the scraper.

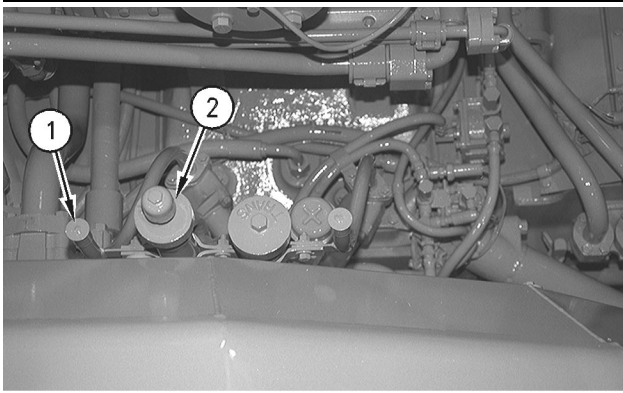


Illustration 207

g00102125

Tractor

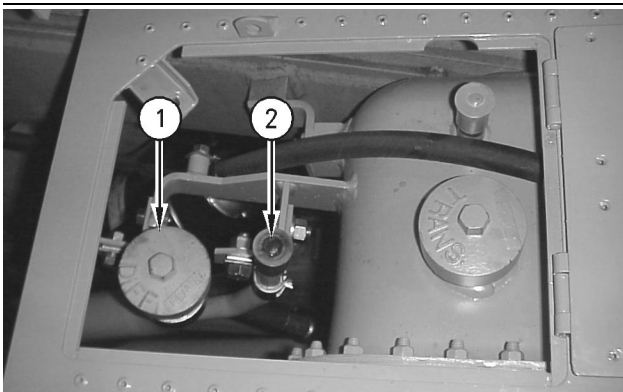


Illustration 208

g00876012

Scraper

1. The proper oil level is between the "FULL and ADD" on the dipstick (1).
2. Remove oil filler cap (2) and add oil, if necessary.

3. Clean the oil filler cap and install the oil filler cap.

i01859475

Differential and Final Drive Oil Sample - Obtain

SMCS Code: 3258-008; 4050-008; 7542-008

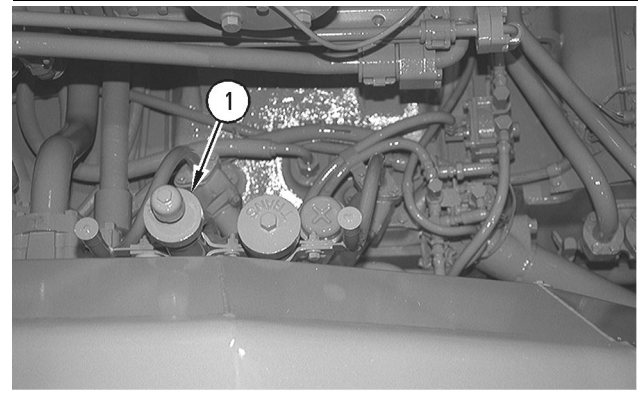


Illustration 209

g00947846

(1) Filler tube for the differential and final drive (tractor)

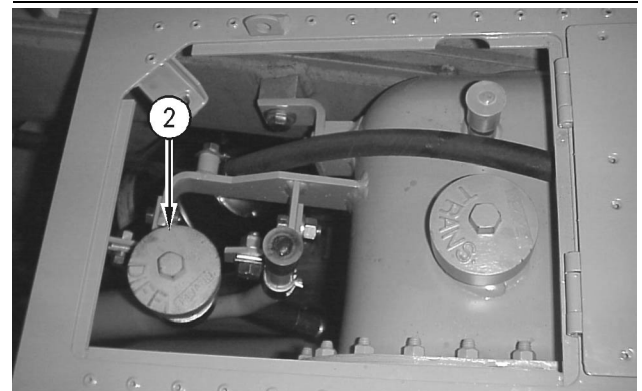


Illustration 210

g00947847

(2) Filler tube for the differential and final drive (scraper)

A sample of the differential and the final drive oil can be obtained by pulling a sample through the filler tube. Filler tube (1) is located on the left rear side of the tractor. Filler tube (2) is located on the right rear side of the scraper engine. Refer to Special Publication, PEHP6001, "How To Take A Good Oil Sample" for more information about obtaining a sample of the differential and final drive oil.

i01701191

Draft Arm Flange Bolts - Check

SMCS Code: 6204-527-BC

S/N: 6PR1-Up

S/N: 7KR1-Up

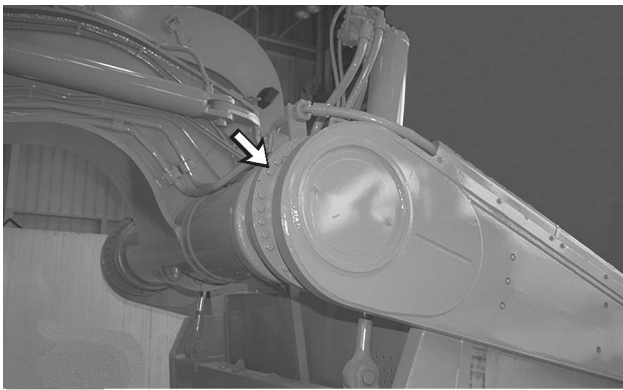


Illustration 211

g00102137

Torque the bolts for the draft arm. Refer to Specifications, "Draft Frame" for the proper torque. Consult your Caterpillar dealer for the tightening procedure for the flange bolts.

i01703526

Draft Arm Wear Plates - Check/Adjust

SMCS Code: 6204-025-WK; 6204-535-WK

S/N: 6PR1-Up

S/N: 7KR1-Up

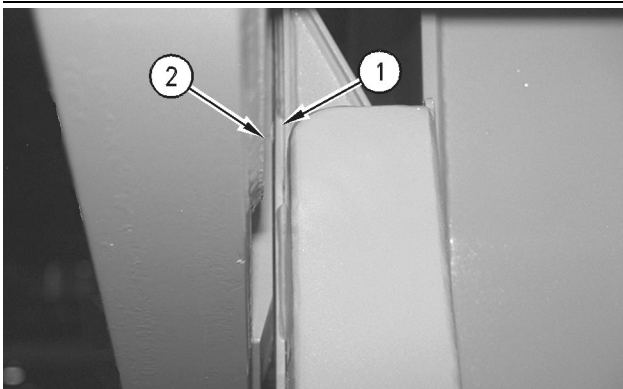


Illustration 212

g00102145

1. Check the clearance between shoe (1) and draft arm wear plate (2). Refer to Specifications, "Draft Frame" for necessary clearance. Add shims, if necessary.



Illustration 213

g00883346

2. Chock the wheels.

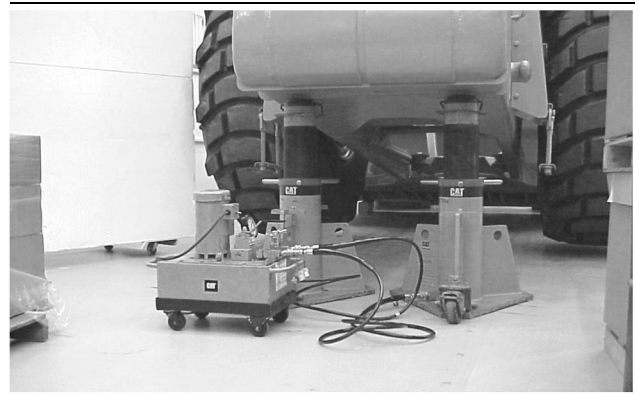


Illustration 214

g00883349

3. Use a suitable lifting device in order to lift the rear of the scraper. Lift the rear of the scraper in order to place the bowl in the lowest possible position. Support the rear of the scraper for safety.
4. Remove the upper bolts for the wear plate.
5. Remove cribbing and raise the bowl as far as possible.
6. Remove lower bolts for the wear plate.
7. Replace shims or replace the wear plate.

Repeat the procedure for the other side of the bowl.

i01702702

Ejector Carrier Rollers - Check/Adjust

SMCS Code: 6229-025; 6229-535

S/N: 6PR1-Up

S/N: 7KR1-Up

Park the machine on level ground. Lower the bowl and close the apron.

Check the adjustment for the ejector carrier rollers. The ejector carrier rollers are correctly adjusted if the ejector does not contact the bottom of the bowl.

The ejector carrier rollers are located at the bottom rear of the ejector.

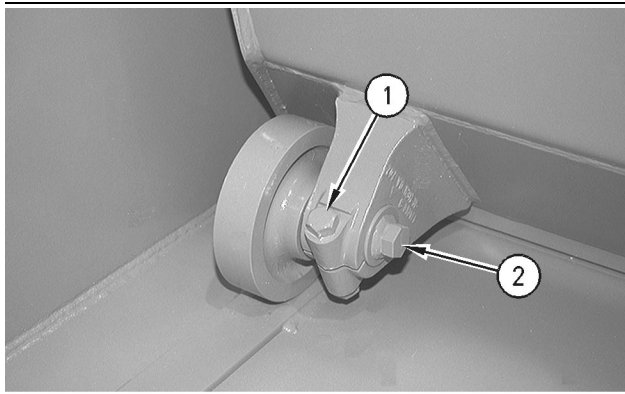


Illustration 215

g00102197

1. Loosen roller shaft clamping bolt (1).
2. Move eccentric roller shaft (2) to a position that allows the ejector to pass over the bottom of the bowl. The ejector carrier rollers must be adjusted so that the clearance between the bottom of the ejector and the bottom of the bowl is between 1.0 to 13.0 mm (.40 to .51 inch).
3. Tighten roller shaft clamping bolt (1).
4. Repeat Step 1 through Step 3 in order to adjust the other ejector carrier rollers.
5. Start the engine. Move the ejector forward and backward. Stop the engine.
6. Check for drag between the ejector and the bottom of the bowl. Repeat the adjustment procedure, if necessary.

i01702786

Ejector Carrier Rollers - Inspect/Pack/Replace

SMCS Code: 6229-040; 6229-086; 6229-510

S/N: 6PR1-Up

S/N: 7KR1-Up

The ejector carrier rollers are located on the bottom rear of the ejector.

Remove any debris from the carrier rollers.

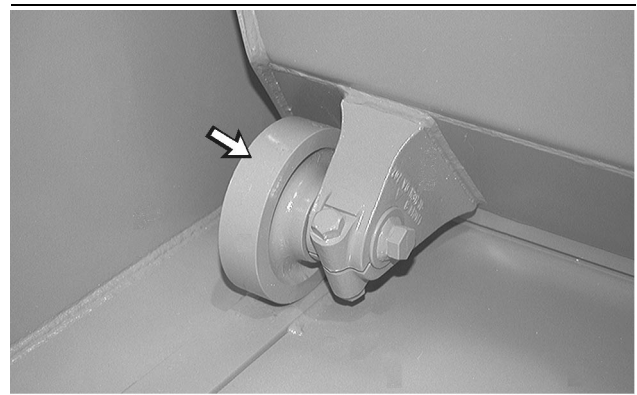


Illustration 216

g00104412

1. Inspect the carrier rollers for damage. Replace the carrier rollers if it is necessary.
2. Pack the carrier rollers. See your Caterpillar dealer for further information on this procedure.

i01702798

Ejector Guide Rollers - Check/Adjust

SMCS Code: 6230-025; 6230-535

S/N: 6PR1-Up

S/N: 7KR1-Up

Park the machine on level ground. Lower the bowl and close the apron. Check the adjustment for the ejector guide rollers. The ejector guide rollers are correctly adjusted if the ejector does not contact the sides of the bowl.

The ejector carrier rollers are located on the rear sides of the ejector.

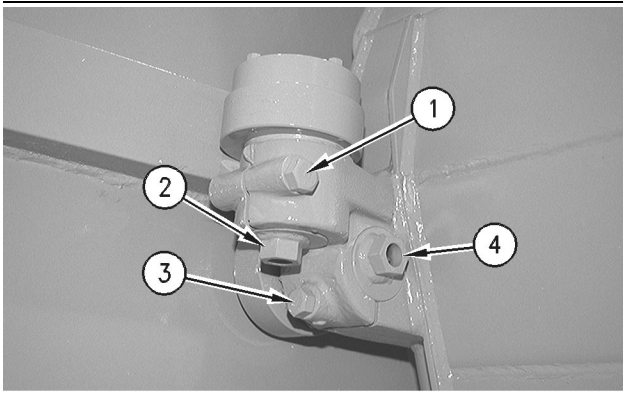


Illustration 217

g00102248

1. Loosen roller shaft clamping bolt (1).
2. Move eccentric roller shaft (2) to a position that allows the ejector to pass between the sides of the bowl. The proper clearance between the ejector guide roller and the bowl is 3.0 to 20.0 mm (.12 to .79 inch).
3. Tighten roller shaft clamping bolt (1).
4. Loosen roller shaft clamping bolt (3).
5. Move eccentric roller shaft (4) to a position that allows the ejector to pass between the sides of the bowl.
6. Tighten roller shaft clamping bolt (3).
7. Repeat Step 1 through Step 6 in order to adjust the other ejector guide rollers.
8. Start the engine. Move the ejector forward and move the ejector backward. Stop the engine.
9. Check for drag between the ejector guide rollers and the bowl. Repeat the adjustment procedure, if necessary.

i01702816

Ejector Guide Rollers - Inspect/Pack/Replace

SMCS Code: 6230-040; 6230-086; 6230-510

S/N: 6PR1-Up

S/N: 7KR1-Up

The ejector guide rollers are located on the back side of the ejector and at the top of the ejector.

Remove any debris from the guide rollers.

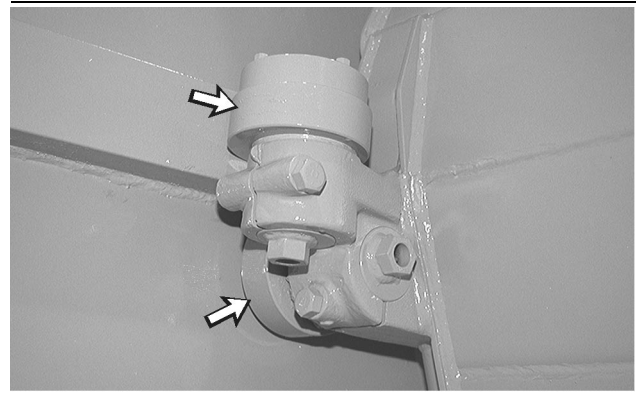


Illustration 218

g00104414

1. Inspect the guide rollers for damage. Replace the guide rollers if it is necessary.
2. Pack the guide rollers. See your Caterpillar Dealer for further information on this procedure.

i01702823

Ejector Support Rollers - Check/Adjust

SMCS Code: 6230-025; 6230-535

S/N: 6PR1-Up

S/N: 7KR1-Up

Park the machine on level ground. Lower the bowl and close the apron.

Check the adjustment for the ejector support rollers. The ejector support rollers are correctly adjusted if the ejector support rollers do not bind against the frame of the ejector.

The support rollers are located on the rear of the support assembly.

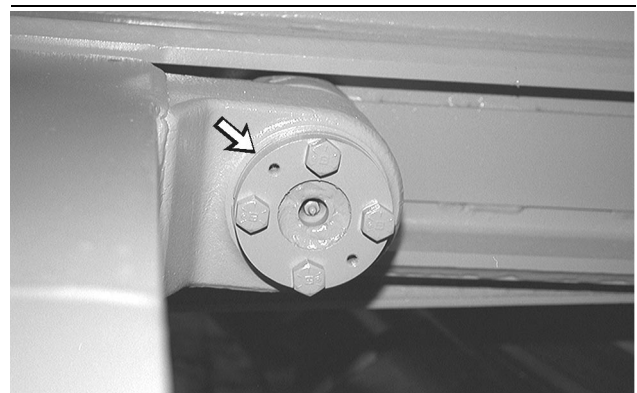


Illustration 219

g00102292

Install the necessary amount of shims in order to achieve the correct clearance between the ejector support rollers and the roller guide plates.

The distance from the outside of one ejector support roller to the outside of the other ejector support roller should be 0.75 to 1.50 mm (.030 to .060 inch) shorter than the narrowest dimension between the roller guide plates.

Consult your Caterpillar Dealer for further information.

Ejector Support Rollers - Inspect/Pack/Replace

i01702837

SMCS Code: 6230-040; 6230-086; 6230-510

S/N: 6PR1-Up

S/N: 7KR1-Up

The ejector support rollers are located on the rear of the support assembly.

Remove any debris from the support rollers.

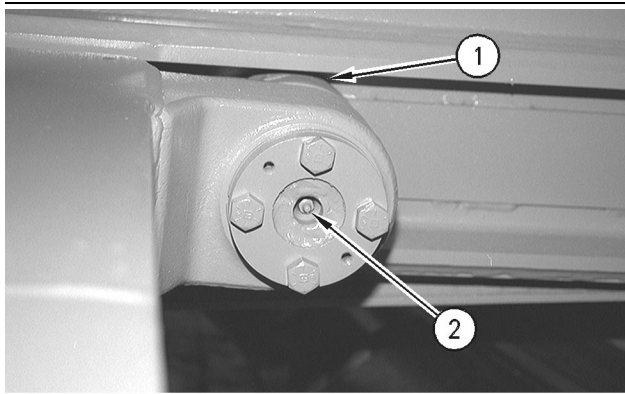


Illustration 220

g00104419

1. Inspect the support rollers (1) for damage. Replace the support rollers if it is necessary.
2. Grease the support roller at zerk (2).

i01696727

Engine Air Filter Primary Element - Clean/Replace

SMCS Code: 1054-070-PY; 1054-510-PY

NOTICE

Service the air cleaner only with the engine stopped. Engine damage could result.

Service the air cleaner filter element when the yellow piston on the engine air filter service indicator enters the red zone or the indicator reads 63.5 cm (25 inch) of water. Refer to Operation and Maintenance Manual, "Engine Air Filter Service Indicator - Inspect".

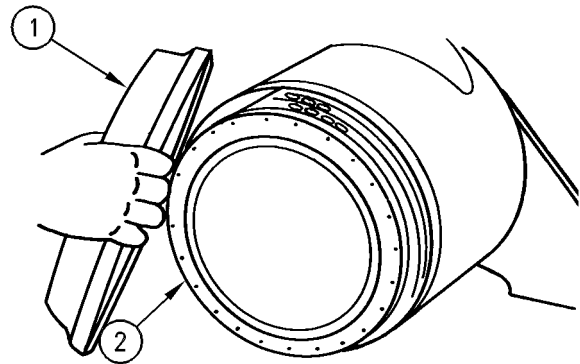


Illustration 221

g00102316

1. Remove cover (1) for the air filter housing .
 2. Remove primary filter element (2) from the air filter housing.
 3. Clean the inside of the air filter housing.
 4. If the machine is equipped with a vacuator valve, clean the vacuator valve on the cover for the air filter housing.
 5. Install a clean primary air filter element. Install the cover for the air filter housing.
- Note:** Refer to "Cleaning Primary Air Filter Elements".
6. Reset the engine air filter service indicator.

If the yellow piston in the indicator moves into the red zone after starting the engine or the exhaust smoke is still black after installation of a clean primary filter element, install a new primary filter element. If the piston remains in the red zone replace the secondary element.

Cleaning Primary Air Filter Elements

NOTICE

Caterpillar recommends certified air filter cleaning services available at participating Caterpillar dealers. The Caterpillar cleaning process uses proven procedures to assure consistent quality and sufficient filter life.

Observe the following guidelines if you attempt to clean the filter element:

Do not tap or strike the filter element in order to remove dust.

Do not wash the filter element.

Use low pressure compressed air in order to remove the dust from the filter element. Air pressure must not exceed 207 kPa (30 psi). Direct the air flow up the pleats and down the pleats from the inside of the filter element. Take extreme care in order to avoid damage to the pleats.

Do not use air filters with damaged pleats, gaskets, or seals. Dirt entering the engine will cause damage to engine components.

The primary air filter element can be used up to six times if the element is properly cleaned and inspected. When the primary air filter element is cleaned, check for rips or tears in the filter material. The primary air filter element should be replaced at least one time per year. This replacement should be performed regardless of the number of cleanings.

NOTICE

Do not clean the air filter elements by bumping or tapping. This could damage the seals. Do not use elements with damaged pleats, gaskets, or seals. Damaged elements will allow dirt to pass through. Engine damage could result.

Visually inspect the primary air filter elements before cleaning. Inspect the air filter elements for damage to the seal, the gaskets, and the outer cover. Discard any damaged air filter elements.

There are two common methods that are used to clean primary air filter elements:

- Pressurized air
- Vacuum cleaning

Pressurized Air

Pressurized air can be used to clean primary air filter elements that have not been cleaned more than two times. Pressurized air will not remove deposits of carbon and oil. Use filtered, dry air with a maximum pressure of 207 kPa (30 psi).

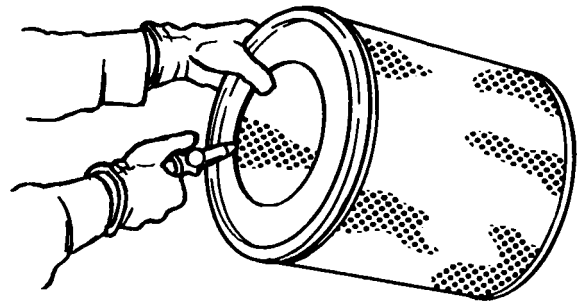


Illustration 222

g00281692

Note: When the primary air filter elements are cleaned, always begin with the clean side (inside) in order to force dirt particles toward the dirty side (outside).

Aim the hose so that the air flows inside the element along the length of the filter in order to help prevent damage to the paper pleats. Do not aim the stream of air directly at the primary air filter element. Dirt could be forced further into the pleats.

Vacuum Cleaning

Vacuum cleaning is another method for cleaning primary air filter elements which require daily cleaning because of a dry, dusty environment. Cleaning with pressurized air is recommended prior to vacuum cleaning. Vacuum cleaning will not remove deposits of carbon and oil.

Inspecting the Primary Air Filter Elements

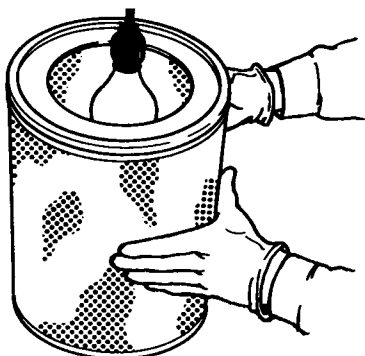


Illustration 223

g00281693

Inspect the clean, dry primary air filter element. Use a 60 watt blue light in a dark room or in a similar facility. Place the blue light in the primary air filter element. Rotate the primary air filter element. Inspect the primary air filter element for tears and/or holes. Inspect the primary air filter element for light that may show through the filter material. If it is necessary in order to confirm the result, compare the primary air filter element to a new primary air filter element that has the same part number.

Do not use a primary air filter element that has any tears and/or holes in the filter material. Do not use a primary air filter element with damaged pleats, gaskets or seals. Discard damaged primary air filter elements.

Storing Primary Air Filter Elements

If a primary air filter element that passes inspection will not be used, the primary air filter element can be stored for future use.

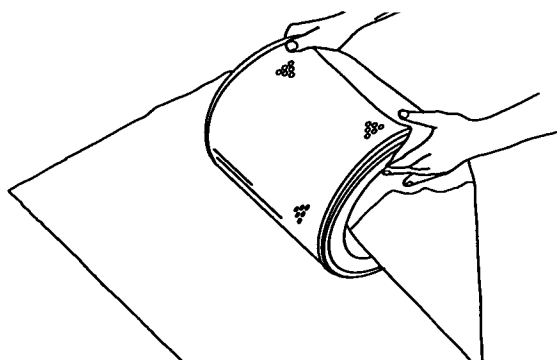


Illustration 224

g00281694

Do not use paint, a waterproof cover, or plastic as a protective covering for storage. An airflow restriction may result. To protect against dirt and damage, wrap the primary air filter elements in Volatile Corrosion Inhibited (VCI) paper.

Place the primary air filter element into a box for storage. For identification, mark the outside of the box and mark the primary air filter element. Include the following information:

- Date of cleaning
- Number of cleanings

Store the box in a dry location.

i00060042

Engine Air Filter Secondary Element - Replace

SMCS Code: 1054-510-SE

NOTICE

Always replace the secondary element. Do not attempt to reuse it by cleaning. Engine damage could result.

Note: Replace the engine air filter secondary element when you service the engine air filter primary element for the third time. If a clean primary element has been installed and the engine air filter service indicator still enters the red zone, replace the secondary element. Also if the exhaust smoke remains black and a clean primary element has been installed, replace the secondary element.

1. Remove the air cleaner cover and the primary element.

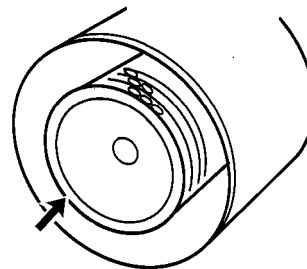


Illustration 225

g00039214

2. Remove the nuts that hold the secondary element to the air cleaner housing. Do not remove the two nuts that hold the air cleaner housing to the inlet manifold. Remove the secondary element.
3. Cover the air inlet opening. Clean the inside of the air cleaner housing.
4. Uncover the air inlet opening. Install a new secondary element. Tighten the nuts to a torque of 27 ± 7 N·m (20 ± 5 lb ft).
5. Install the primary element and the air cleaner housing cover. Use your fingers to tighten the cover bolts. Do not use a tool to tighten the bolts.

i01696854

Engine Air Filter Service Indicator - Inspect

SMCS Code: 7452-040

NOTICE

Service the air cleaner only with the engine stopped. Engine damage could result.

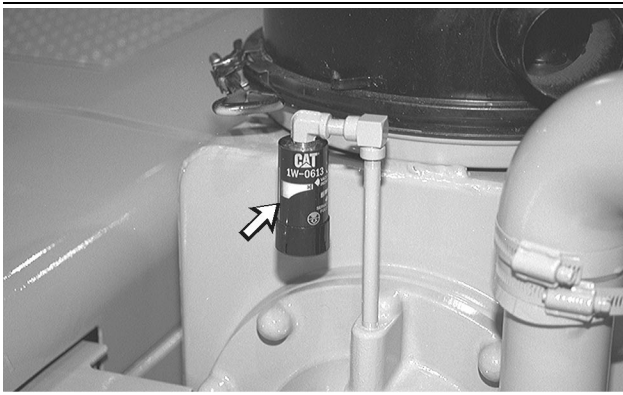


Illustration 226

g00102325

1. Start the engine.
2. Run the engine at high idle.
3. If the yellow piston in the filter service indicator enters the red zone, service the air cleaner.
4. Stop the engine.

Note: See the Operation and Maintenance Manual, "Engine Air Filter Primary Element - Clean/Replace". See the Operation and Maintenance Manual, "Engine Air Filter Secondary Element - Replace".

Note: Refer to Operation and Maintenance Manual, "Engine Air Filter Service Indicator - Inspect/Replace" in order to check an engine air filter service indicator that is faulty.

i01697515

Engine Air Filter Service Indicator - Inspect/Replace

SMCS Code: 7452-040; 7452-510

1. Open the access door.

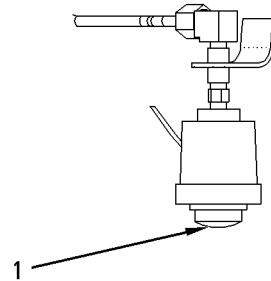


Illustration 227

g00873872

2. Stop the engine. Check the operation of the service indicator by pressing reset button (1) on the bottom of the service indicator. This should require three pushes or less of the reset button.
3. Next, check the movement of the yellow piston in the service indicator. Start the engine and accelerate the engine to high idle for a few seconds. After the accelerator control (pedal) is released, the yellow piston should remain at the highest position that was achieved during acceleration.

Note: The air filter indicator should be replaced during engine overhauls. The air filter indicator should also be replaced during replacement of any major engine component. Replace the air filter indicator at least one time per year.

4. If the indicator will not reset easily, replace the service indicator. If the yellow piston of the indicator will not latch at the highest vacuum that is attained, replace the service indicator. Tighten the indicator to a torque of 2 N·m (18 lb in). Excessive tightening force may crack the top of the indicator. For more information on the air filter indicator, refer to Video Tape, PEVN1736, "Caterpillar Air Filter Service Indicator".

Note: If you still believe that the service indicator is working improperly, refer to Operation and Maintenance Manual, "Engine Air Filter Service Indicator Screen - Check/Replace".

5. Close the access door.

i01360098

Engine Air Filter Service Indicator Screen - Check/Replace

SMCS Code: 7452-510-Z3; 7452-535-Z3

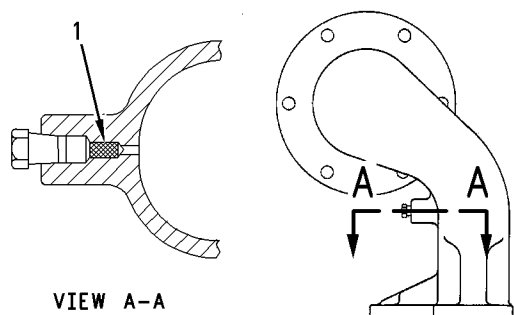


Illustration 228

g00713605

Typical Example

Check

1. Set an **8N-2694** Air Filter Service Indicator to indicate a restricted indicator screen.
2. Screw the indicator onto a 1/8 inch NPT pipe nipple.
3. Screw the other end of the nipple into the threaded hole in the elbow. Normally, filter screen (1) is located in the elbow.
4. Depress the reset button on the **8N-2694** Air Filter Service Indicator.
5. If the indicator resets, filter screen (1) is not plugged. If the indicator does not reset, filter screen (1) is plugged. Filter screen (1) should then be replaced.

Replace

1. Remove the air cleaner from the air cleaner housing. Removing the air cleaner from the air cleaner housing will provide access to the hole inside the elbow. Filter screen (1) is installed inside the elbow.

2. A 2 inch piece of 1/8 inch drill rod is needed in order to push filter screen (1) from the inside of the elbow to the outside.
3. After the plugged filter screen (1) has been removed, install a new filter screen (1) in the hole on the outside of the elbow. Use a piece of 1/4 inch drill rod to lightly seat the filter element in the bottom of the bore.

i01550089

Engine Air Precleaner - Clean

SMCS Code: 1055-070

NOTICE

Service the engine air precleaner only with the engine stopped. Engine damage could result.

The engine air precleaner is positioned on top of the engine compartment.

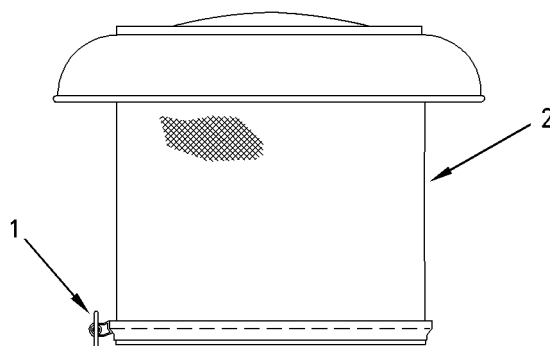


Illustration 229

g00805907

1. Loosen clamp (1) at the bottom of engine air precleaner (2).
2. Remove engine air precleaner (2) and inspect the opening for dirt and debris. Clean the tubes, if necessary.
3. Clean engine air precleaner (2) with pressure air or wash the engine air precleaner (2) in clean warm water.
4. Install engine air precleaner (2). Tighten clamp (1).

i00060057

Engine Crankcase Breather - Clean

SMCS Code: 1317-070

S/N: 5YR1-Up

S/N: 6TR1-Up

1. Open the access cover.

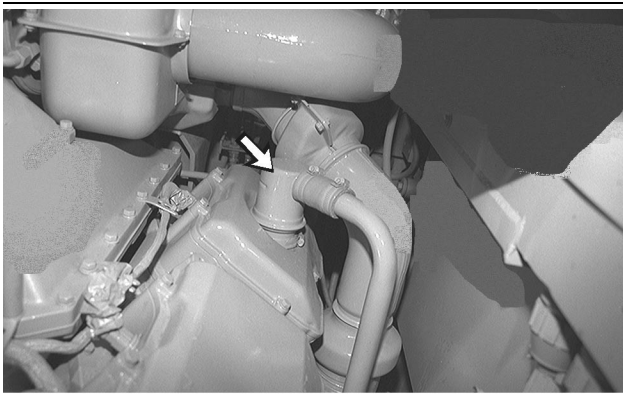


Illustration 230

g00102333

2. Loosen the breather outlet hose clamps. Remove the hose from the breather cover.
3. Loosen the breather inlet hose clamp. Remove the engine crankcase breather.
4. Check the condition of the breather seal. Replace the seal if the seal is damaged.
5. Wash the breather in a clean nonflammable solvent.
6. Shake the breather until the breather is dry. You may also use pressure air to dry the breather.
7. Check the condition of the hose. Replace the hose if the hose is damaged.
8. Install the breather.
9. Install the hose and the breather outlet hose clamps.
10. Repeat Step 2 to Step 9 for the second engine crankcase breather.
11. Close the access cover.

i01697582

Engine Crankcase Breather - Clean

SMCS Code: 1317-070

S/N: 6PR1-Up

S/N: 7KR1-Up

1. Open the access cover (if equipped).

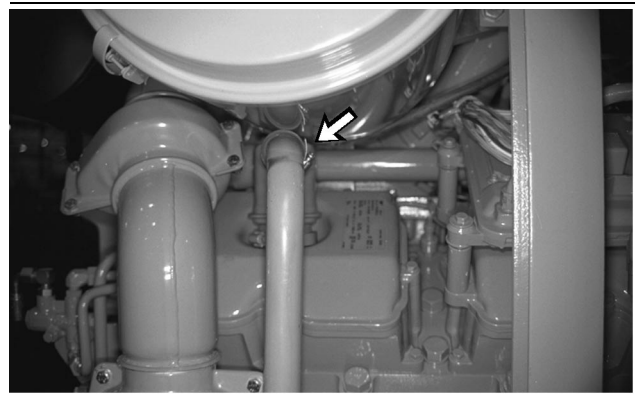


Illustration 231

g00873938

2. Loosen the breather outlet hose clamps. Remove the hose from the breather cover.
3. Loosen the breather inlet hose clamp. Remove the engine crankcase breather.
4. Check the condition of the breather seal. Replace the seal if the seal is damaged.
5. Wash the breather in a clean nonflammable solvent.
6. Shake the breather until the breather is dry. You may also use pressure air to dry the breather.
7. Check the condition of the hose. Replace the hose if the hose is damaged.
8. Install the breather.
9. Install the hose and the breather outlet hose clamps.
10. Repeat Step 2 to Step 9 for the second engine crankcase breather.
11. Close the access cover.

i01697778

Engine Oil (High Speed) and Oil Filter - Change

SMCS Code: 1318-510-HZ

S/N: 5YR1-Up

S/N: 6TR1-Up

WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Your machine may be equipped with a high speed arrangement for changing the engine oil. The high speed arrangement allows the oil to be quickly withdrawn. The high speed arrangement allows the oil to be quickly replaced.

The high speed arrangement has a hose which is attached to the oil pan at the drain hole. The other end of the hose has a quick coupler. The quick coupler is located in the engine compartment on the right side of the tractor.

1. Drain the crankcase while the oil is warm. This allows waste particles that are suspended in the oil to drain. As the oil cools, the waste particles will settle to the bottom of the crankcase. The particles will not be removed by draining the oil and the particles will recirculate in the engine lubrication system with the new oil. Park the machine on a level surface. Shut off the engine. Apply the parking brake.

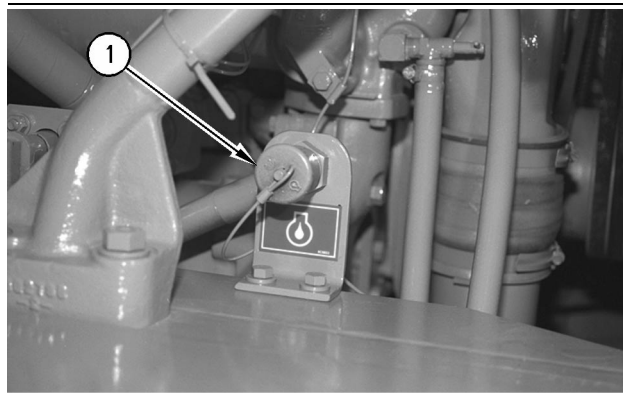


Illustration 232

g00874040

2. Clean the area around the dust cover (1) for the male quick coupler that is on the hose. Remove the dust cover. Clean the male fitting.
3. Remove the dust cover from female fitting of the suction hose. Clean the female fitting. Attach the suction hose to the male fitting. Remove the oil from the engine.

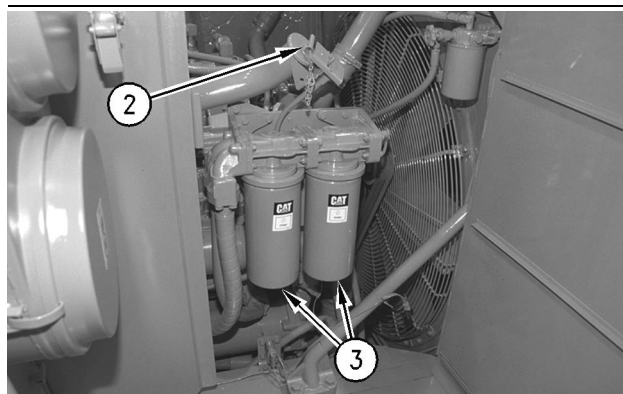


Illustration 233

g00874065

4. Remove the filter elements (3) with a strap type wrench. Refer to Operation and Maintenance Manual, "Oil Filter - Inspect".
5. Clean the filter mounting base with a clean towel. Make sure that the old filter gasket has been removed.
6. Apply a thin film of clean engine oil to the sealing surface of the new filter element.
7. Install the new filter elements hand tight. When the gasket contacts the filter base, turn the filter by 270 degrees more. This will tighten the filter sufficiently.

8. Every new oil filter has marks which are for determining the rotation index. These marks are spaced at 90 degree increments. Use the rotation index marks as a guide for tightening the oil filter.
9. Pump new oil into the engine. See the following topics:
 - Operation and Maintenance Manual, "Lubricant Viscosities"
 - Operation and Maintenance Manual, "Capacities (Refill)"
10. Remove the hose from the male coupler. Install the dust cover.
11. Start the engine and allow the oil to warm. Check the engine for leaks. Check the male fitting for leaks. Check the filter for leaks. Shut off the engine.
12. Check the oil level on the dipstick (2). Maintain the oil between the marks on the "SAFE OPERATING RANGE" side of the dipstick. If necessary, add oil.

i01697868

Engine Oil (High Speed) and Oil Filter - Change

SMCS Code: 1318-510-HZ

S/N: 6PR1-Up

S/N: 7KR1-Up

WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Your machine may be equipped with a high speed arrangement for changing the engine oil. The high speed arrangement allows the oil to be quickly withdrawn. The high speed arrangement allows the oil to be quickly replaced.

The high speed arrangement has a hose which is attached to the oil pan at the drain hole. The other end of the hose has a quick coupler.

1. Drain the crankcase while the oil is warm. This allows waste particles that are suspended in the oil to drain. As the oil cools, the waste particles will settle to the bottom of the crankcase. The particles will not be removed by draining the oil and the particles will recirculate in the engine lubrication system with the new oil. Park the machine on a level surface. Shut off the engine. Apply the parking brake.

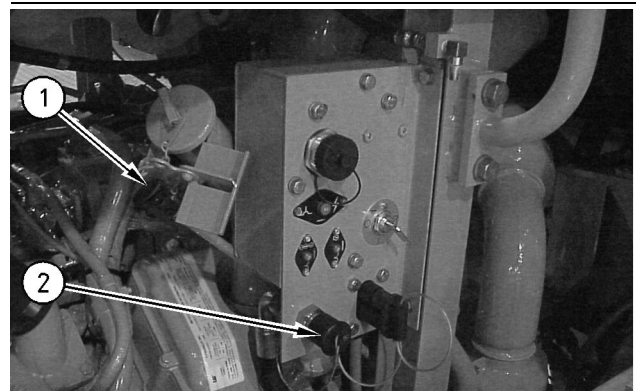


Illustration 234

g00874087

2. Clean the area around the dust cover (2) for the male quick coupler that is on the hose. Remove the dust cover. Clean the male fitting.
3. Remove the dust cover from female fitting of the suction hose. Clean the female fitting. Attach the suction hose to the male fitting. Remove the oil from the engine.

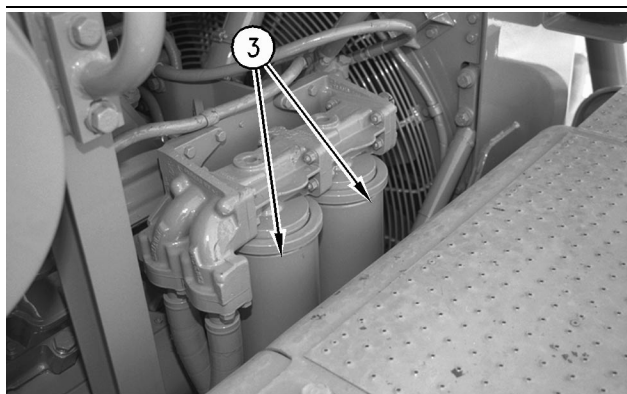


Illustration 235

g00874098

4. Remove the filter elements (3) with a strap type wrench. Refer to Operation and Maintenance Manual, "Oil Filter - Inspect".
5. Clean the filter mounting base with a clean towel. Make sure that the old filter gasket has been removed.
6. Apply a thin film of clean engine oil to the sealing surface of the new filter element.
7. Install the new filter elements hand tight. When the gasket contacts the filter base, turn the filter by 270 degrees more. This will tighten the filter sufficiently.
8. Every new oil filter has marks which are for determining the rotation index. These marks are spaced at 90 degree increments. Use the rotation index marks as a guide for tightening the oil filter.
9. Pump new oil into the engine. See the following topics:
 - Operation and Maintenance Manual, "Lubricant Viscosities"
 - Operation and Maintenance Manual, "Capacities (Refill)"
10. Remove the hose from the male coupler. Install the dust cover.
11. Start the engine and allow the oil to warm. Check the engine for leaks. Check the male fitting for leaks. Check the filter for leaks. Shut off the engine.
12. Check the oil level on the dipstick (1). Maintain the oil between the marks on the "SAFE OPERATING RANGE" side of the dipstick. If necessary, add oil.

Engine Oil Level - Check

SMCS Code: 1000-535-FLV

S/N: 5YR1-Up

S/N: 6TR1-Up

WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

NOTICE

Do not under fill or overfill engine crankcase with oil. Either condition can cause engine damage.

1. Open the access cover that is on the right side of the machine.

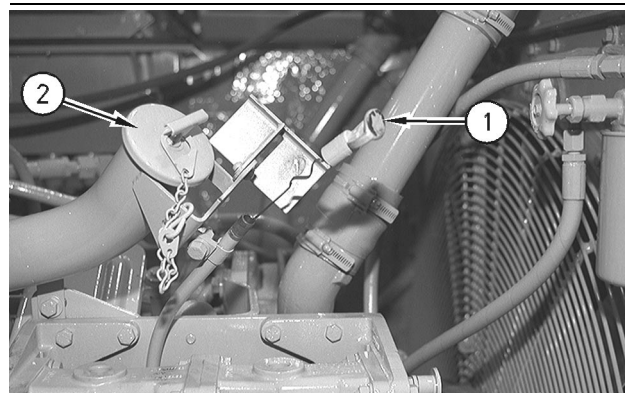


Illustration 236

g00102335

2. Check the "SAFE OPERATING RANGE" side of dipstick (1) while the engine is running. Maintain the oil level between the "ADD" mark and the "FULL" mark.

Check the "SAFE STARTING RANGE" side of dipstick (1) while the engine is stopped. Maintain the oil level between the "LOW" mark and the "FULL" mark.

Note: When you operate the machine on severe slopes, the oil level in the engine crankcase must be at the "FULL" mark on the "SAFE STARTING RANGE" side of the dipstick.

3. Remove oil filler cap (2). If necessary, add oil.
4. Clean the oil filler cap and install the oil filler cap.
5. Close the access cover.

i01697977

Engine Oil Level - Check

SMCS Code: 1000-535-FLV

S/N: 6PR1-Up

S/N: 7KR1-Up

WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

NOTICE

Do not under fill or overfill engine crankcase with oil. Either condition can cause engine damage.

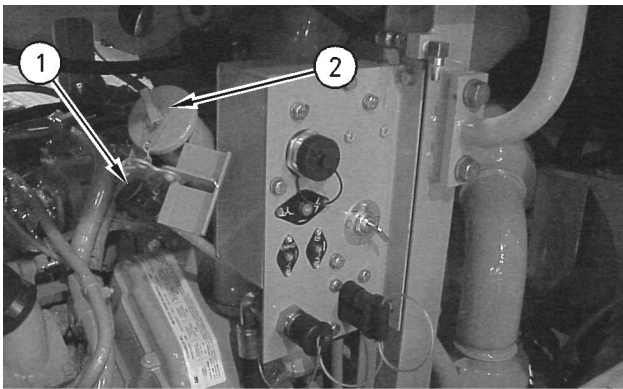


Illustration 237

g00874164

1. Check the "SAFE OPERATING RANGE" side of dipstick (1) while the engine is running. Maintain the oil level between the "ADD" mark and the "FULL" mark.

Check the "SAFE STARTING RANGE" side of dipstick (1) while the engine is stopped. Maintain the oil level between the "LOW" mark and the "FULL" mark.

Note: When you operate the machine on severe slopes, the oil level in the engine crankcase must be at the "FULL" mark on the "SAFE STARTING RANGE" side of the dipstick.

2. Remove oil filler cap (2). If necessary, add oil.
3. Clean the oil filler cap and install the oil filler cap.

i01922383

Engine Oil Sample - Obtain

SMCS Code: 1000-008; 7542-008

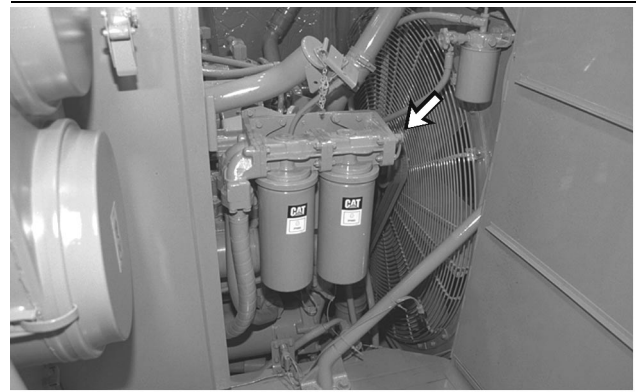


Illustration 238

g00874334

The sampling valve for the engine oil for the tractor is located on the filter base. The engine oil filter is located on the right side of the engine in the engine compartment.

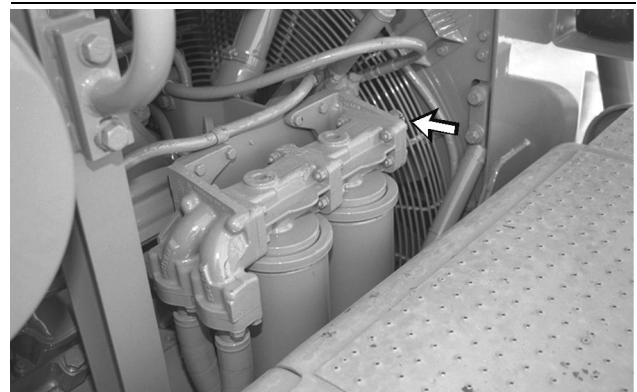


Illustration 239

g00874330

The sampling valve for the engine oil for the scraper is located on the filter base. The engine oil filter for the scraper is located on the left side of the scraper engine.

Refer to Special Publication, SEBU6250, "S-O-S Oil Analysis" for information that pertains to obtaining a sample of the engine oil. Refer to Special Publication, PEHP6001, "How To Take A Good Oil Sample" for more information about obtaining a sample of the engine oil.

i01698376

Engine Oil and Filter - Change

SMCS Code: 1318-510

S/N: 5YR1-Up

S/N: 6TR1-Up

WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

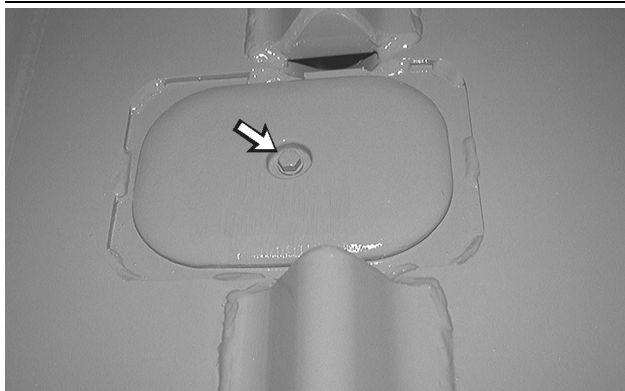


Illustration 240

g00102391

The oil drain for the tractor engine is located on the engine oil pan. A guard covers the oil pan.

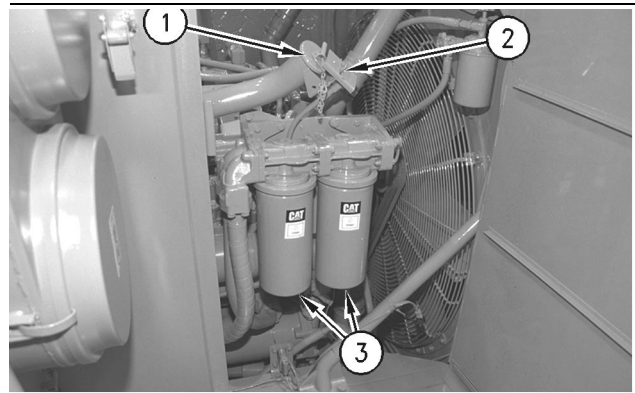


Illustration 241

g00874354

The oil filter (3) for the tractor is on the right side of the engine.

Note: Drain the crankcase while the oil is warm. This allows waste particles that are suspended in the oil to drain. As the oil cools, the waste particles will settle to the bottom of the crankcase. The particles will not be removed by draining the oil and the particles will recirculate in the engine lubrication system with the new oil.

1. Park the machine on a level surface and engage the parking brake. Stop the engine.

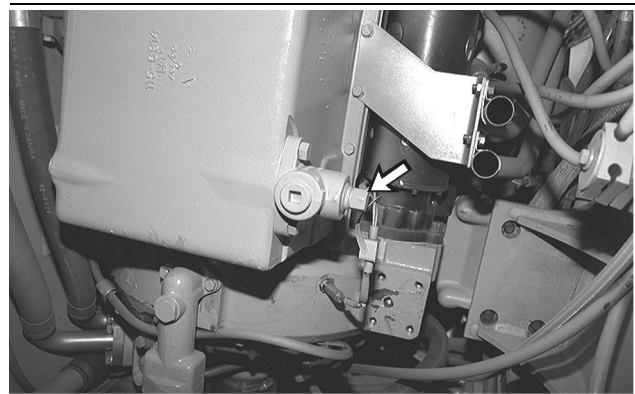


Illustration 242

g00102392

2. Remove the drain plug through the access hole.
3. Allow the oil to drain into a suitable container.
4. Close the crankcase drain valve. Install the drain plug.
5. Open the access door on the right side of the engine.
6. Remove the oil filter (3) with a strap type wrench. See Operation and Maintenance Manual, "Oil Filter - Inspect". Discard the used oil filter properly.

7. Clean the filter housing base. Make sure that all of the old filter gasket is removed.
8. Apply a thin coat of engine oil to the gasket of the new filter.
9. Install the new filter by hand. When the gasket contacts the filter base, turn the filter by 270 degrees more. This will tighten the filter sufficiently.
10. Every new oil filter has marks which are for determining the rotation index. These marks are spaced at 90 degree increments. Use the rotation index marks as a guide for tightening the oil filter.
11. Remove oil filler cap (1). Fill the crankcase with new oil. See Operation and Maintenance Manual, "Capacities (Refill)". Clean oil filler cap(1) and install oil filler cap (1).
12. Start the engine and allow the oil to warm. Check the engine for leaks. Check the filter for leaks.
13. Run the engine and check dipstick (2) after the engine has been running for ten minutes. Maintain the oil between the marks on the "SAFE OPERATING RANGE" side of the dipstick. If necessary, add oil.
14. Close the engine access door and stop the engine.

i01698411

Engine Oil and Filter - Change

SMCS Code: 1318-510

S/N: 6PR1-Up

S/N: 7KR1-Up

WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

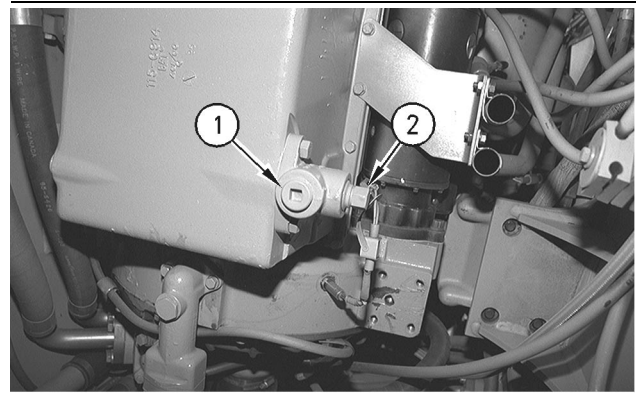


Illustration 243

g00874372

The crankcase drain for the scraper engine is located on the oil pan of the engine.

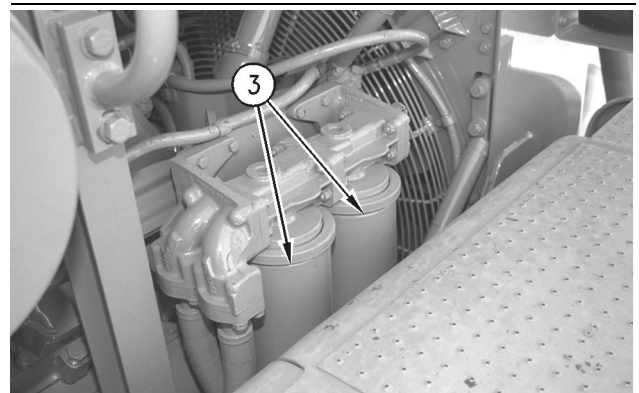


Illustration 244

g00874373

The oil filter (3) for the scraper is located on the right side of the engine.

Park the machine on a level surface and engage the parking brake. Stop the engine.

Note: Drain the crankcase while the oil is warm. This allows waste particles that are suspended in the oil to drain. As the oil cools, the waste particles will settle to the bottom of the crankcase. The particles will not be removed by draining the oil and the particles will recirculate in the engine lubrication system with the new oil.

1. Remove the crankcase drain plug (1).
2. Open the crankcase drain valve (2).
3. Allow the oil to drain into a suitable container.
4. Close the drain valve.
5. Install the drain plug.
6. Remove the oil filter (3) with a strap type wrench. See Operation and Maintenance Manual, "Oil Filter - Inspect". Discard the used oil filter properly.
7. Clean the filter housing base. Make sure that all of the old filter gasket is removed.
8. Apply a thin coat of engine oil to the gasket of the new filter.
9. Install the new filter by hand. When the gasket contacts the filter base, turn the filter by 270 degrees more. This will tighten the filter sufficiently.
10. Every new oil filter has marks which are for determining the rotation index. These marks are spaced at 90 degree increments. Use the rotation index marks as a guide for tightening the oil filter.

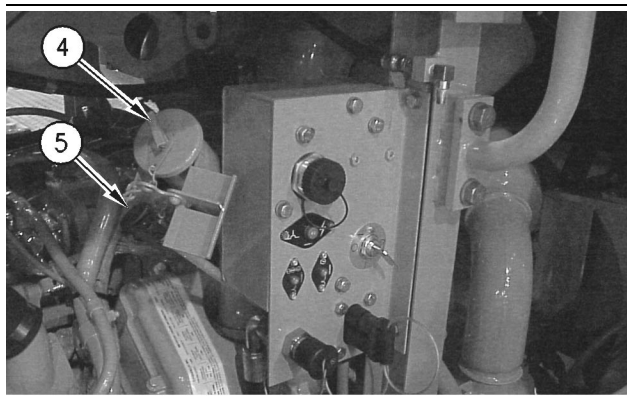


Illustration 245

g00874406

11. Clean the outside of the oil filler cap (4). Remove oil filler cap. Fill the crankcase with new oil. See Operation and Maintenance Manual, "Capacities (Refill)". Clean the oil filler cap and install the oil filler cap.

12. Start the engine and allow the oil to warm. Check the engine for leaks. Check the filter for leaks.

13. Run the engine and check the dipstick (5) after the engine has been running for ten minutes. Maintain the oil between the marks on the "SAFE OPERATING RANGE" side of the dipstick. If necessary, add oil.

i01719360

Engine Transfer Gear Scavenge Screen - Clean

SMCS Code: 1164-070-Z3

S/N: 5YR1-Up

S/N: 6TR1-Up

The scavenge screen is located under the rear of the engine.

Wipe all surfaces around the openings before removing any components.

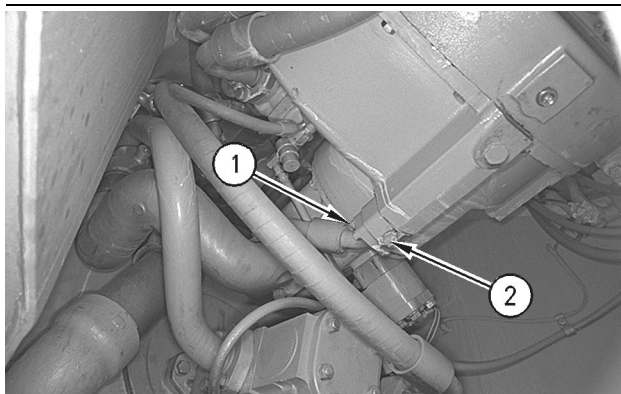


Illustration 246

g00104385

1. Remove the drain plug (2) and allow the oil to drain into a suitable container.

Note: Discard the drained fluids according to local regulations.

2. Remove the bolts (1) and remove the scavenge screen.
3. Wash the scavenge screen in a clean, nonflammable solvent.
4. Clean the drain plug (2).
5. Install the drain plug (2).
6. Install the scavenge screen. Tighten the bolts (1).

i01714628

Engine Valve Lash - Check

SMCS Code: 1105-535

WARNING

Ensure that the engine can not be started while this maintenance is being performed. To help prevent possible injury, do not use the starting motor to turn the flywheel.

Hot engine components can cause burns. Allow additional time for the engine to cool before measuring/adjusting valve lash clearance.

NOTICE

Only qualified service personnel should perform this maintenance. Refer to the Service Manual or your Caterpillar dealer for the complete valve lash adjustment procedure.

Operation of Caterpillar engines with improper valve adjustments can reduce engine efficiency. This reduced efficiency could result in excessive fuel usage and/or shortened engine component life.

The initial valve lash adjustment is recommended at the first scheduled oil change. The valve lash adjustment should then be made at every 2000 hour interval. The adjustment is necessary due to the initial wear of the valve train components and to the seating of the valve train components.

This maintenance is recommended by Caterpillar as part of a lubrication and preventive maintenance schedule in order to help provide maximum engine life.

Ensure that the engine is stopped before measuring the valve lash. To obtain an accurate measurement, allow the valves to cool before this maintenance is performed.

Refer to the Service Manual for more information.

i00060158

Engine Valve Rotators - Inspect

SMCS Code: 1109-040

WARNING

When inspecting the valve rotators, protective glasses or face shield and protective clothing must be worn, to prevent being burned by hot oil spray.

Inspect the engine valve rotators after the valve clearances have been set.

1. Start the engine and run the engine at low idle.

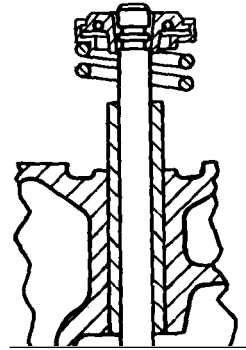


Illustration 247

g00102450

2. Watch the top surface of each valve rotator. When the intake valve or the exhaust valve closes, the engine valve rotator should turn slightly.

If an intake valve or an exhaust valve fails to rotate, consult your Caterpillar Dealer.

i00060184

Ether Starting Aid Cylinder - Replace

SMCS Code: 1456-510-CD

S/N: 5YR1-Up

S/N: 6TR1-Up

1. The ether starting aid cylinder is mounted on the right side of the engine compartment.
2. Open the access cover.

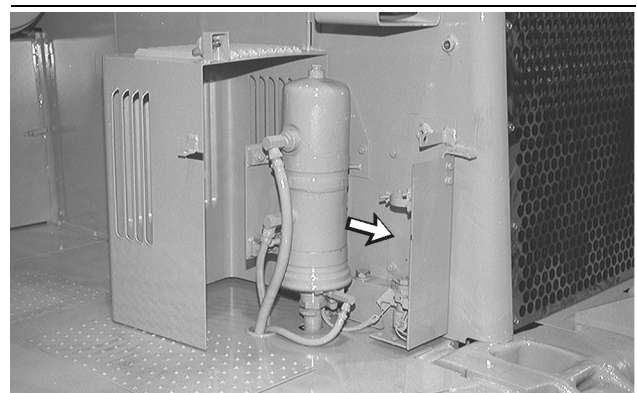


Illustration 248

g00102454

3. Loosen the cylinder retaining clamp. Unscrew the empty ether starting aid cylinder and remove the empty ether starting aid cylinder.
4. Remove the used gasket. Install the new gasket. A new gasket is provided with each new ether starting aid cylinder.
5. Install the new ether starting aid cylinder. Tighten the ether starting aid cylinder hand tight. Tighten the cylinder retaining clamp securely.
6. Close the access cover.

i01698753

Ether Starting Aid Cylinder - Replace

SMCS Code: 1456-510-CD

S/N: 6PR1-Up

S/N: 7KR1-Up

1. The ether starting aid cylinder is mounted on the right side of the scraper.
2. Open the access cover.

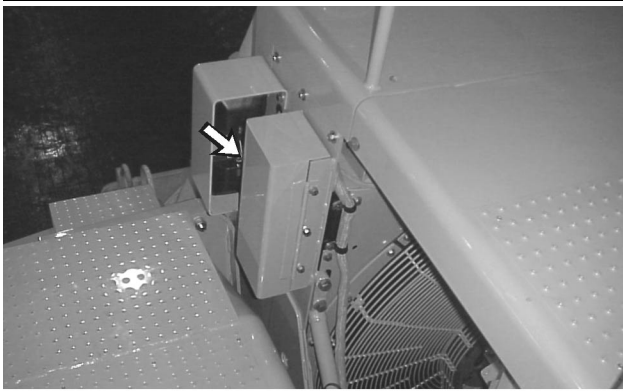


Illustration 249

g00874621

3. Loosen the cylinder retaining clamp. Unscrew the empty ether starting aid cylinder and remove the empty ether starting aid cylinder.
4. Remove the used gasket. Install the new gasket. A new gasket is provided with each new ether starting aid cylinder.
5. Install the new ether starting aid cylinder. Tighten the ether starting aid cylinder hand tight. Tighten the cylinder retaining clamp securely.
6. Close the access cover.

i00060217

Fan Drive Bearing and Belt Tightener - Lubricate

SMCS Code: 1358-086; 1359-086-BD

Note: Wipe all the grease fittings before lubricating.

1. Open the engine access cover on the right side of the engine.

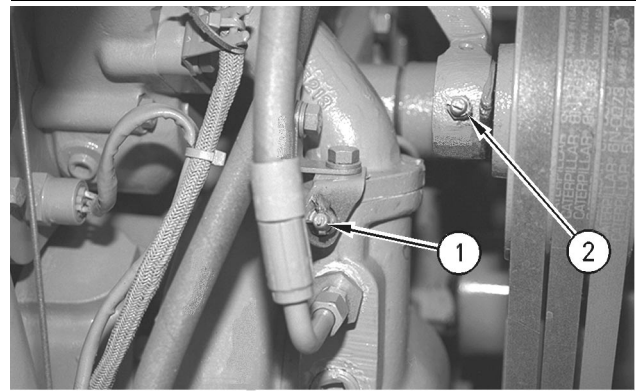


Illustration 250

g00102467

2. Apply lubricant through fitting (1) for the fan drive bearing. Apply lubricant through fitting (2) for the belt tightener.
3. Close the engine access cover.

i01699358

Fuel System - Prime

SMCS Code: 1250-548

S/N: 5YR1-Up

S/N: 6TR1-Up

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

i01699237

1. Open the access door on the right side of the machine.



Illustration 251

g00102470

2. Turn the priming pump plunger counterclockwise and pull out the priming pump plunger.
3. Operate the fuel priming pump in order to fill the new filter element. Continue to operate the fuel priming pump until the pump resists operation. This indicates that the filter element is full of fuel.
4. Push the priming pump plunger downward and turn the priming pump plunger clockwise in order to lock the priming pump plunger.
5. Start the engine. Look for leaks around the filter element. If the engine will not start or the engine misfires, more priming is necessary.
6. If the engine runs rough after start-up, shut off the engine. Loosen the vent plug on the block for the fuel return. The block for the fuel return is at the upper left rear of the engine. Release the priming pump plunger and prime the fuel system until a continuous stream of fuel is flowing from the opening. Catch the fuel in a suitable container. Install the vent plug and lock the priming pump plunger. Start the engine and run the engine at low idle until the engine does not run rough.

Note: Discard any drained fluids according to local regulations.

7. Close the access door.

Fuel System - Prime

SMCS Code: 1250-548

S/N: 6PR1-Up

S/N: 7KR1-Up

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

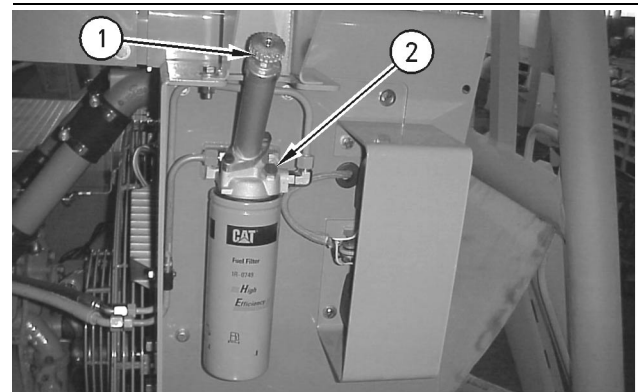


Illustration 252

g00874798

The fuel priming pump for the scraper is mounted on the left rear of the machine.

The pump is used when the following operations occur:

- Changing the fuel filters
- Priming the fuel system
- Changing the fuel lines
- Purging air from the fuel system

Note: Do not attempt to start the engine until the fuel system is purged of air.

1. Open the purge screw (2) on the secondary filter base.

2. Turn the knob (1) of the priming pump plunger counterclockwise in order to unlock the plunger.
3. Pull up and push down on the knob in order to pump fuel.

Note: The pump will fill the filters.

Note: If the pump will not pump fuel, the pump may be faulty or an air leak may occur on the suction side of the fuel system.

4. Continue to prime the fuel system until the flow of fuel is free of air bubble's.
5. Close the purge screw. If you have only changed the fuel filters, go to Step 8. If you have air in the fuel system for some other reason, continue with Step 6.
6. Prime the fuel injector nozzle by first opening the fuel inlet line. The fuel injector nozzle must be held in order to open the fuel line. The line may need to be wiggled slightly in order to allow the fuel to flow from the line.
7. Continue to prime the fuel system until the flow of fuel from the line is free of air bubble's. Close the line. Follow this procedure for all of the injectors.
8. Continue pumping the knob. The fuel system is primed when resistance is felt in the system.
9. Push in on the knob for the pump. Turn the knob clockwise in order to lock the knob.
10. Start the engine. If the engine will not start, further priming is necessary. If the engine starts but the engine continues to misfire, further priming is necessary. If the engine starts but the engine continues to emit smoke, further priming is necessary.
11. If the engine starts but the engine runs rough, continue to run the engine at low idle. Continue to run the engine at low idle until the engine runs smoothly.

i01699573

Fuel System Secondary Filter - Replace

SMCS Code: 1261-510-SE

S/N: 5YR1-Up

S/N: 6TR1-Up

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

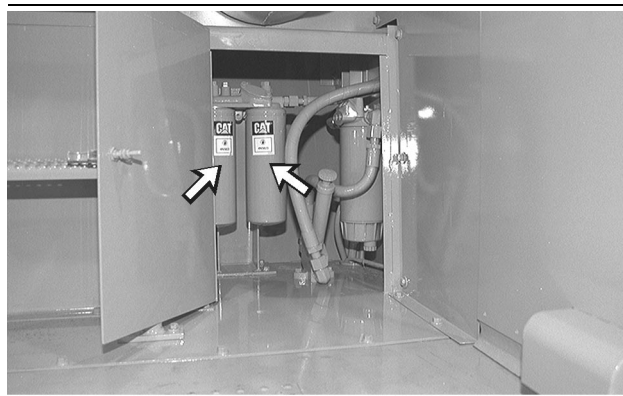


Illustration 253

g00103948

Before you replace the secondary filters, replace the primary filter.

The secondary filters are behind the access door on the right side of the machine.

1. Close the fuel supply valve. The fuel supply valve is located behind the primary filter for the fuel system.
2. Remove the secondary filters. Discard the filters properly.
3. Clean the filter housing base. Make sure that all of the old seal is removed.
4. Coat the seals of the new secondary filters with clean diesel fuel.

5. Install the new filters by hand. When the seal contacts the base, tighten the filter for an additional 3/4 turn.

Rotation index marks are positioned on the filters at 90 degree intervals. Use these rotation index marks as a guide when you tighten the filter.

6. Open the fuel supply valve.
7. Prime the fuel system. See Operation and Maintenance, "Fuel System - Prime".
8. Start the engine and check for leaks.

i01699584

Fuel System Secondary Filter - Replace

SMCS Code: 1261-510-SE

S/N: 6PR1-Up

S/N: 7KR1-Up

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

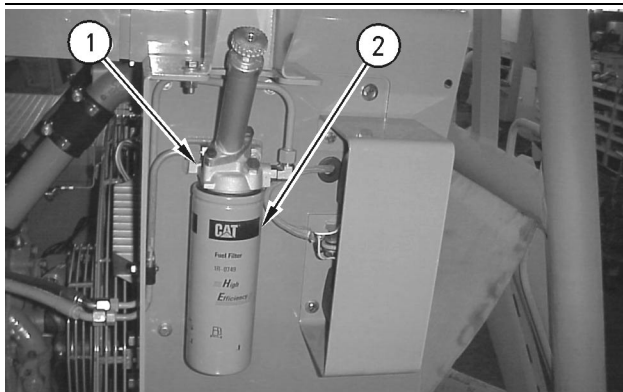


Illustration 254

g00874976

The secondary fuel filter for the scraper is mounted on the left rear of the machine.

1. Park the machine on a level surface.
 2. Lower the bowl.
 3. Shut off the engine.
 4. Move the fuel valve to the CLOSED position.
 5. Clean the secondary filter (2). Clean the filter base (1) which is located above the filter.
 6. Turn the filter to the left in order to loosen the filter. Loosen the filter with a strap type wrench.
 7. Remove the filter. Clean the bottom of the filter base. Make sure that all of the old filter seal is removed.
 8. Apply clean diesel fuel to the seal of the new secondary filter.
 9. Install the new filter by hand. When the seal contacts the base, tighten the filter for an additional 3/4 turn. Rotation index marks are positioned on the filters at 90 degree intervals. Use these rotation index marks as a guide when you tighten the filter.
 10. Return the fuel valve to the OPEN position.
 11. Purge the air from the fuel system. See the Operation and Maintenance Manual, "Fuel System - Prime" for further instructions.
- Note:** The primary fuel filter should also be changed at this time. See the Operation and Maintenance Manual, "Fuel System Primary Filter - Replace" for further instructions.
- Note:** The fuel system water separator also needs to be changed at this time. See Operation and Maintenance Manual, "Fuel System Water Separator Element - Replace".
12. Start the engine and check for leaks.

i01699594

Fuel System Water Separator - Drain

SMCS Code: 1263-543

S/N: 5YR1-Up

S/N: 6TR1-Up

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

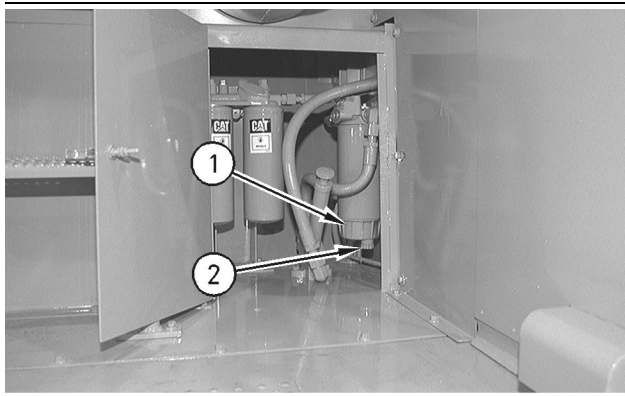


Illustration 255

g00874987

The fuel system water separator is located on the right side of the engine below the primary fuel filter.

1. Open drain (2) on water separator bowl (1).
2. Drain the water from water separator bowl (1).
Close the drain (2).

i01699603

Fuel System Water Separator - Drain

SMCS Code: 1263-543

S/N: 6PR1-Up

S/N: 7KR1-Up

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

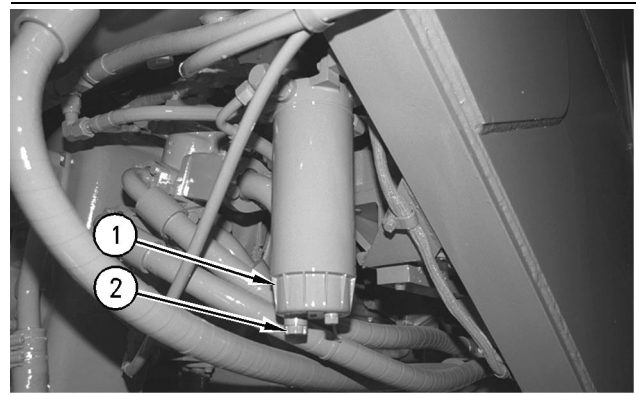


Illustration 256

g00874997

The fuel system water separator is located on the left rear side of the scraper below the primary fuel filter.

1. Open drain (2) on water separator bowl (1).
2. Drain the water from water separator bowl (1).
Close the drain (2).

i00842136

Fuel Tank Cap and Strainer - Clean

SMCS Code: 1273-070-STR; 1273-070-Z2

The fuel tank cap is located on the top of the fuel tank. The fuel cap has a filter element that is located within the cap. The filter element filters the air that enters the fuel tank as the fuel level changes. The strainer is located under the fuel cap. The strainer will strain the fuel as the fuel enters the fuel tank.

1. Remove the fuel tank cap.
2. Remove the gasket that is part of the fuel cap. Inspect the gasket for damage. Replace the gasket if the old gasket is damaged.
3. Disassemble the fuel tank cap. Remove the filter elements. Clean the filter elements in clean, nonflammable solvent. Apply a thin coat of oil to the filter elements. Assemble the fuel tank cap. Install the gasket.
4. Remove the strainer. Clean the strainer in clean, nonflammable solvent. Install the strainer.
5. Install the fuel tank cap.

i01699660

Fuel Tank Water and Sediment - Drain

SMCS Code: 1273-543-M&S

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

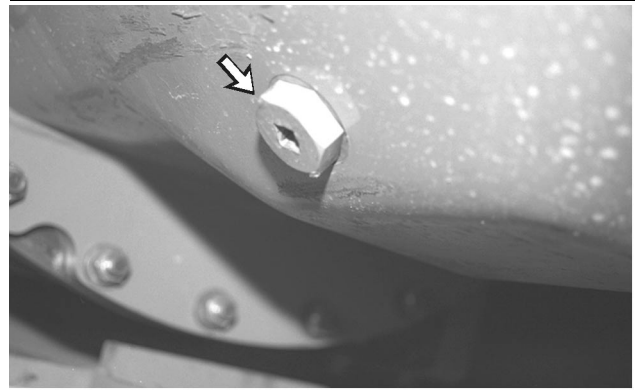


Illustration 257

g00875051

The drain valve is under the fuel tank on the right side of the machine.

1. Remove the plug from the drain valve.
2. Open the drain valve. Allow the water and the sediment to drain into a suitable container.
3. Close the drain valve. Install the drain valve plug.

i01703577

Fuses - Replace

SMCS Code: 1417-510

S/N: 5YR1-Up

S/N: 6TR1-Up

NOTICE

Replace fuses with the same type and size only. Otherwise, electrical damage can result.

If it is necessary to replace fuses frequently, an electrical problem may exist. Contact your Caterpillar dealer.

Fuses – The fuses protect the electrical system from damage that is caused by overloaded circuits. If the element inside the fuse separates, replace the fuse. Check the circuit if the element is separated in the new fuse. Repair the circuit, if necessary.

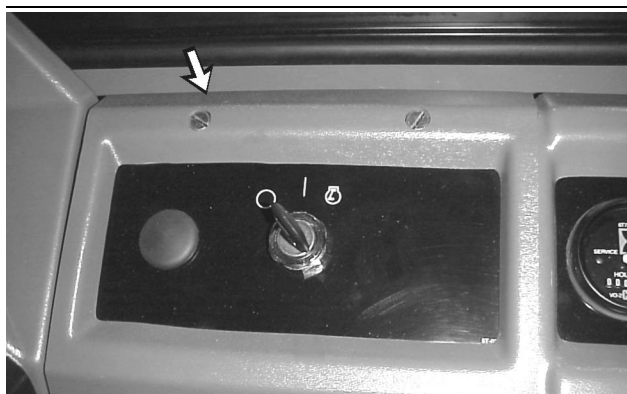


Illustration 258

g00877436

The fuse panel is located inside the cab on the right front side.

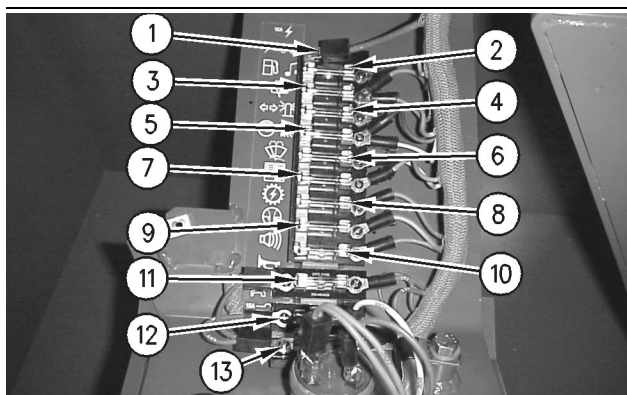


Illustration 259

g00877121



Apron Solenoid and Differential Lock (1) – 10 AMP



Fuel Pump (2) – 10 AMP



Rear Window Wiper and Washer (3) – 10 AMP



Auxiliary Circuit (4) – 10 AMP



Rear Flood Lights and Gauges (5) – 10 AMP



Front Window Wiper and Washer (6) – 10 AMP



EMS (7) – 10 AMP



Transmission (8) – 10 AMP



Air Dryer (9) – 10 AMP



Backup Alarm (10) – 10 AMP



Air Horn (11) – 10 AMP



Bail and Cushion-Hitch (12) – 10 AMP



i00061542

Hitch - Inspect

SMCS Code: 4305-040; 7107-040; 7113-040

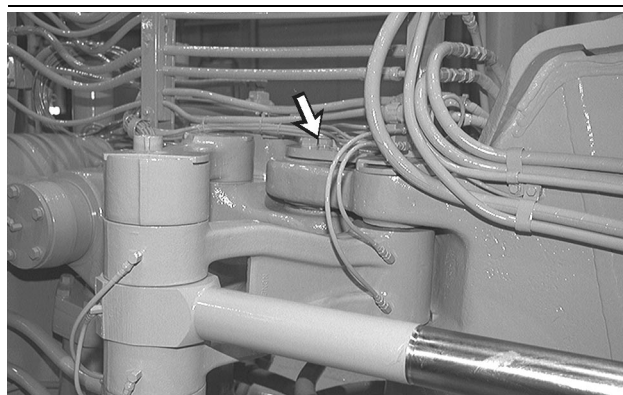


Illustration 260

g00102797

Inspect the upper vertical hitch pin for wear or damage. Replace the upper vertical hitch pin, if necessary.

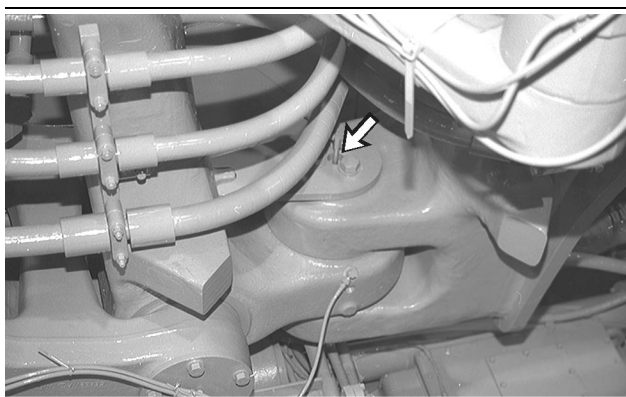


Illustration 261

g00102798

Inspect the lower vertical hitch pin for wear or damage. Replace the lower vertical hitch pin, if necessary.

Consult your Caterpillar Dealer for the allowable tolerance of all the vertical hitch pins.

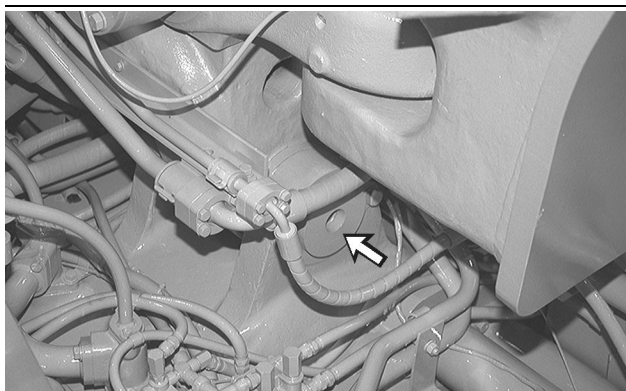


Illustration 262

g00102799

Inspect the two horizontal hitch pins for wear or for damage. Replace the horizontal hitch pins, if necessary.

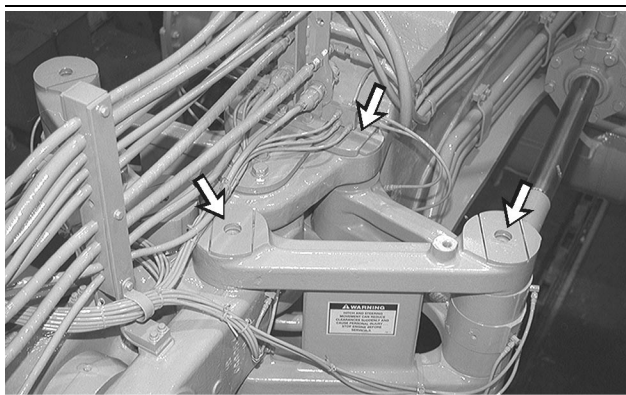


Illustration 263

g00102800

There are six shafts in the steering link. Inspect the shafts for wear or for damage. Replace the shafts in the steering link, if necessary.

i00061636

Hitch - Lubricate

SMCS Code: 7107-086; 7113-086

Wipe all of the fittings before you inject grease into the fittings.

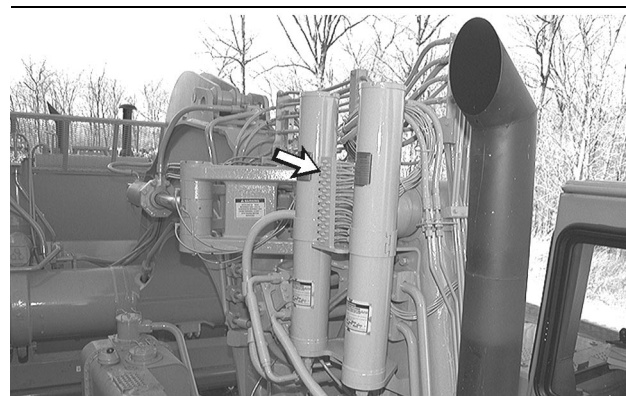


Illustration 264

g00102815

Inject the grease into 34 fittings that are located on the lube fitting block. These fittings provide lubrication to the joint assembly in front of the vertical hitch pins.

Note: If any remote lines are damaged, replace the damaged remote lines. Fill the new remote lines with grease.

i01699826

Hydraulic System Oil - Change

SMCS Code: 5056-044

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Note: If the hydraulic oil is not being monitored by the Caterpillar S-O-S Oil Analysis program, change the hydraulic oil at every 2000 service hour interval.

The machine must meet the following conditions before you change the hydraulic tank oil.

- The machine must be level.
- The parking brake must be applied.
- The hydraulic oil must be warm.
- The transmission control must be in NEUTRAL.
- The bowl must be lowered.

Wipe all surfaces around openings before adding oil.

1. Move the hydraulic controls in order to relieve the system pressure.

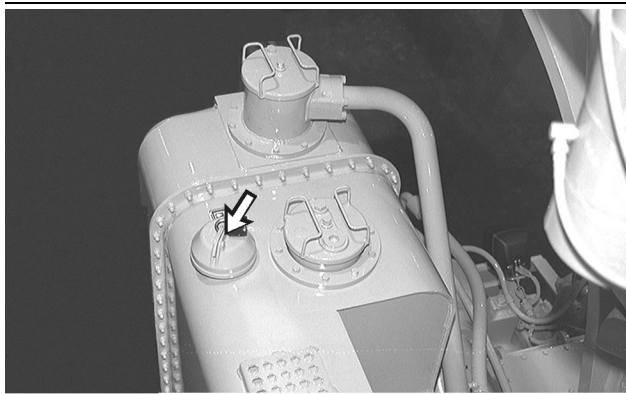


Illustration 265

g00102868

2. Remove the oil filler cap for the hydraulic system slowly in order to relieve pressure. Also remove the oil filler strainer.
3. Wash the filler screen and the filler cap in a clean nonflammable solvent.

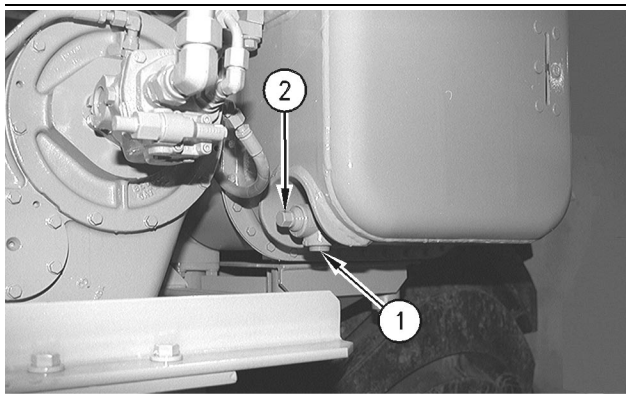


Illustration 266

g00102872

4. Remove the drain plug (1). The drain plug is located in the bottom of the hydraulic tank.
5. Open the tank drain valve (2). Allow the oil to drain into a suitable container. Close the tank drain valve.

Note: Discard the drained fluids according to local regulations.

6. Change the hydraulic system filters. See Operation and Maintenance Manual, "Hydraulic System Oil Filter - Replace".
7. Clean the drain plug and install the drain plug. Tighten the drain plug to a torque of 68 ± 7 N·m (50 ± 5 lb ft).
8. Install the filler screen.
9. Fill the hydraulic tank. See Operation and Maintenance Manual, "Capacities (Refill)".
10. Inspect the gasket for the oil filler cap. If the gasket is damaged, replace the gasket.
11. Install the oil filler cap.
12. Start the engine and run the engine for a few minutes.

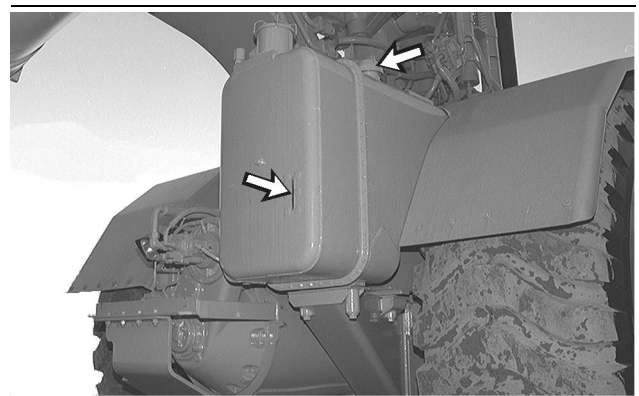


Illustration 267

g00102874

13. Maintain the oil level above the "ADD" mark in the sight gauge. Add oil, if necessary.

Note: The oil must be free from bubbles. If there are bubbles in the oil, then air is entering the hydraulic system. Inspect the suction hoses and the clamps.

14. Stop the engine. If necessary, tighten any loose clamps and any loose connections. Replace any damaged hoses.

i01699854

Hydraulic System Oil Filter - Replace

SMCS Code: 5068-510

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

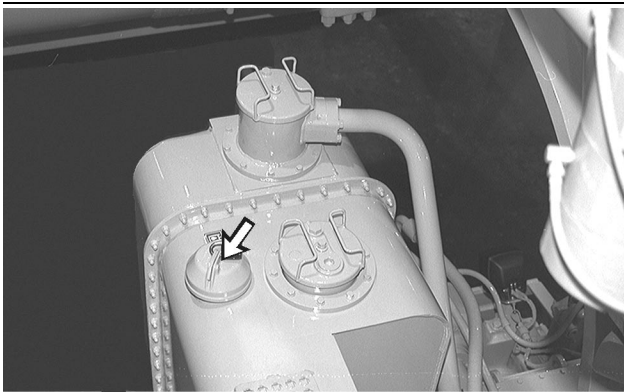


Illustration 268

g00102885

1. Remove the oil filler cap slowly in order to relieve the tank pressure.

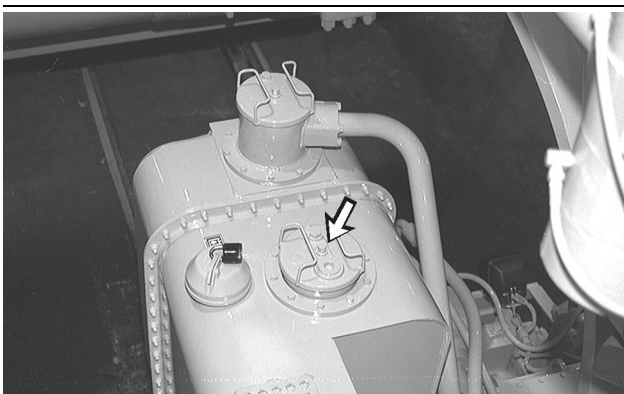


Illustration 269

g00102893

2. Remove the filter cover.

3. Inspect the cover seal. Replace the cover seal, if necessary.
4. Remove the filter elements and discard the filter elements.
5. Remove the screen. Wash the screen in clean, nonflammable solvent.
6. Install the screen and two new filter elements.
7. Install the filter cover.

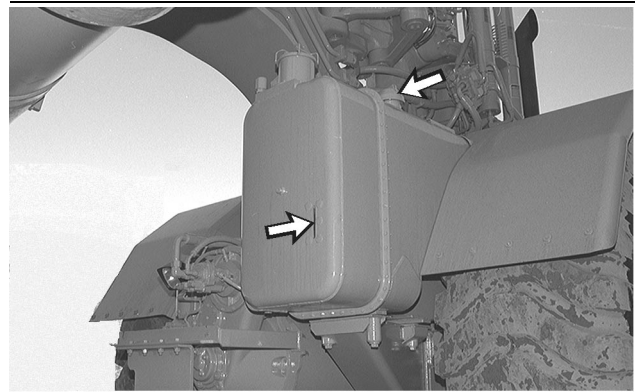


Illustration 270

g00102913

8. Maintain the oil level above the "ADD" mark in the sight gauge. Add oil, if necessary.
9. Inspect the filler cap gasket. Replace the filler cap gasket if the filler cap gasket is damaged.
10. Install the oil filler cap.

i01699861

Hydraulic System Oil Level - Check

SMCS Code: 5050-535-FLV

S/N: 5YR1-Up

S/N: 6TR1-Up

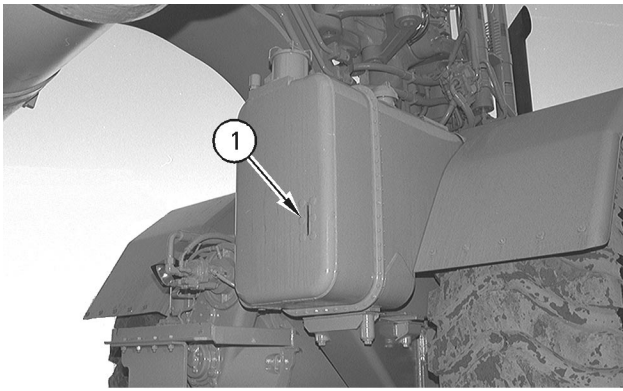


Illustration 271

g00875178

The hydraulic tank is located at the rear of the tractor. Clean the sight gauge (1) in order to view the oil level.

Note: The machine must meet the following conditions before you check the hydraulic tank oil level.

- The machine must be level.
- The parking brake must be applied.
- The hydraulic oil must be warm.
- The engine must be running at low idle.
- The transmission control must be in NEUTRAL.
- The cushion-hitch must be in the OFF position.
- The ejector must be moved forward.
- Apply slight downward pressure on the bowl.

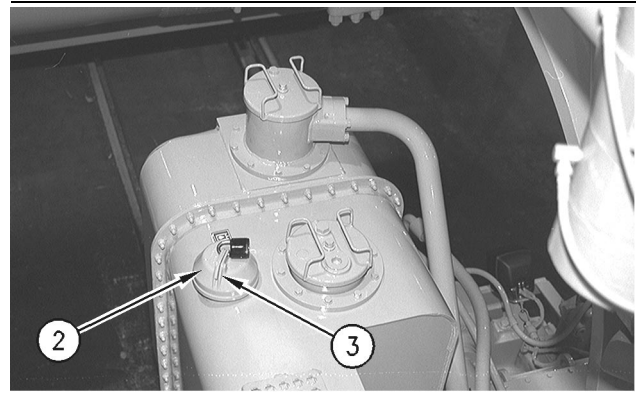


Illustration 272

g00875179

If oil is needed, add oil to the hydraulic tank.

The hydraulic oil filler cap (2) is located on top of the hydraulic tank.

1. You should clean the cap before you remove the cap. This cap is a locking cap. You need to remove the padlock if a padlock is on the cap. Raise the lever (3) in order to engage the lug. Turn the cap counterclockwise in order to remove the cap. Remove the cap slowly in order to relieve the air pressure.
2. Add hydraulic oil until the oil level is at the full mark.
3. Clean the cap. Inspect the cap for damage to the seal. Replace the seal if the seal is damaged.
4. Install the oil filler cap.

i01922442

Hydraulic System Oil Sample - Obtain

SMCS Code: 5050-008; 7542-008

S/N: 5YR1-Up

S/N: 6TR1-Up

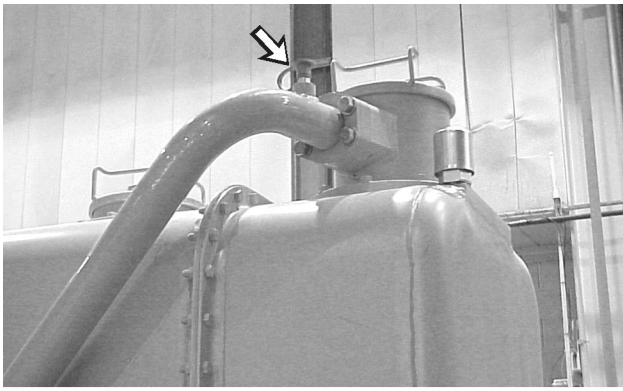


Illustration 273

g00877183

The sampling valve for the hydraulic oil is located on top of the return tube and near the hydraulic tank.

Refer to Special Publication, SEBU6250, "S·O·S Oil Analysis" for information that pertains to obtaining a sample of the hydraulic oil. Refer to Special Publication, PEHP6001, "How To Take A Good Oil Sample" for more information about obtaining a sample of the hydraulic oil.

i00078390

Hydraulic Tank Breaker Relief Valve - Clean

SMCS Code: 5118-070



Illustration 274

g00104395

The hydraulic tank breaker relief valve is located on the top of the hydraulic tank at the rear of the tractor.

1. Remove the breaker relief valve slowly in order to relieve the pressure.
2. Wash the breaker relief valve in a clean nonflammable solvent.
3. Shake the breaker relief valve until the breaker relief valve is dry. You may also use pressure air to dry the breaker relief valve.
4. Inspect the breaker relief valve and inspect the O-ring seal. Replace any of these components, if necessary.
5. Install the breaker relief valve.

i01719384

Oil Filter - Inspect

SMCS Code: 1308-507; 3004-507; 3067-507; 5068-507

Inspect a Used Filter for Debris

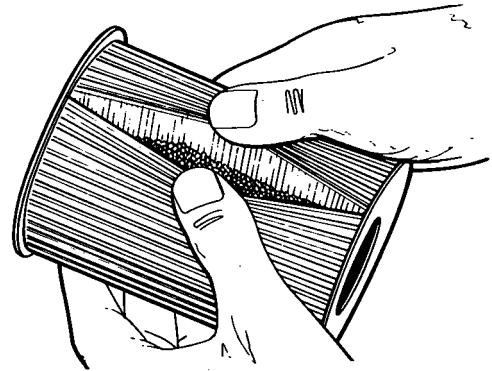


Illustration 275

g00100013

The element is shown with debris.

Use a **4C-5084** Filter Cutter or a **175-7546** Oil Filter Cutter to cut the filter element open. Spread apart the pleats and inspect the element for metal and for other debris. An excessive amount of debris in the filter element can indicate a possible failure.

If metals are found in the filter element, a magnet can be used to differentiate between ferrous metals and nonferrous metals.

Ferrous metals can indicate wear on steel parts and on cast iron parts.

Nonferrous metals can indicate wear on the aluminum parts of the engine such as main bearings, rod bearings, or turbocharger bearings.

Small amounts of debris may be found in the filter element. This could be caused by friction and by normal wear. Consult your Caterpillar dealer in order to arrange for further analysis if an excessive amount of debris is found.

Using an oil filter element that is not recommended by Caterpillar can result in severe engine damage to engine bearings, to the crankshaft, and to other parts. This can result in larger particles in unfiltered oil. The particles could enter the lubricating system and the particles could cause damage.

i01699925

Push Plate - Lubricate

SMCS Code: 6077-086

S/N: 5YR1-Up



Illustration 276

g00875237

Apply 5P-0960 Molybdenum Grease to the face of the push plate with a putty knife.

This reduces the wear on the push plate. Wear to the push block is reduced.

i01715240

Radiator Core - Clean

SMCS Code: 1353-070-KO

You can use compressed air, high pressure water, or steam to remove dust and other debris from the radiator core. However, the use of compressed air is preferred.

Note: At the same interval, clean the air conditioner condenser.

See Special Publication, SEBD0518, "Know Your Cooling System" for the complete procedure for cleaning the radiator core.

i01823412

Refrigerant Dryer - Replace

SMCS Code: 7322-710

WARNING

Personal injury can result from contact with refrigerant.

Contact with refrigerant can cause frost bite. Keep face and hands away to help prevent injury.

Protective goggles must always be worn when refrigerant lines are opened, even if the gauges indicate the system is empty of refrigerant.

Always use precaution when a fitting is removed. Slowly loosen the fitting. If the system is still under pressure, release it slowly in a well ventilated area.

Personal injury or death can result from inhaling refrigerant through a lit cigarette.

Inhaling air conditioner refrigerant gas through a lit cigarette or other smoking method or inhaling fumes released from a flame contacting air conditioner refrigerant gas, can cause bodily harm or death.

Do not smoke when servicing air conditioners or wherever refrigerant gas may be present.

Use a certified recovery and recycling cart to properly remove the refrigerant from the air conditioning system.

NOTICE

If the refrigerant system has been open to the outside air (without being plugged) for more than 30 minutes, the receiver-dryer must be replaced. Moisture will enter an open refrigerant system and cause corrosion which will lead to component failure.

Refer to Service Manual, SENR5664, "Air Conditioning and Heating R-134a For All Caterpillar Machines" for the proper procedure to change the receiver-dryer assembly and for the procedure to reclaim the refrigerant gas.

i01696168

i00061976

Rollover Protective Structure (ROPS) - Inspect

SMCS Code: 7323-040; 7325-040

S/N: 5YR1-Up

S/N: 6TR1-Up

NOTICE

Do not attempt to straighten the ROPS structure. Do not repair the ROPS by welding reinforcement plates to the structure.

If there are any cracks in the welds, in the castings, or in any metal section of the ROPS, consult your Caterpillar dealer for repairs.

1. Inspect the ROPS for loose bolts. Inspect the ROPS for damaged bolts. Replace the damaged bolts and the missing bolts with original equipment parts only. Torque the bolts to $1050 \pm 150 \text{ N}\cdot\text{m}$ ($775 \pm 110 \text{ lb ft}$).

Note: Apply oil to all ROPS bolt threads before you install the bolt. Failure to apply oil can result in improper bolt torque.

2. Operate the machine on a rough surface. Replace the ROPS mounting supports if the ROPS makes a noise or if the ROPS rattles.

If there are any cracks in the welds, in the castings, or in any metal section of the ROPS, consult your Caterpillar dealer for repairs.

Seat Accumulator - Check

SMCS Code: 7336-535

S/N: 5YR1-Up

S/N: 6TR1-Up

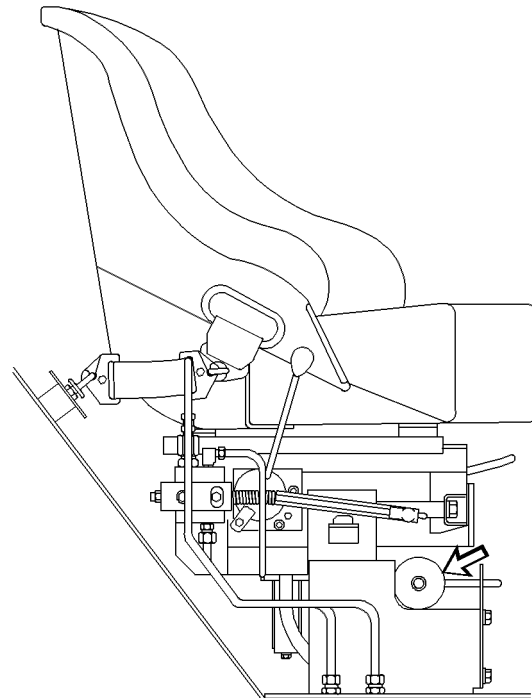


Illustration 277

g00103137

The seat accumulator is located under the operator's seat.

Check the nitrogen precharge pressure.

Consult your Caterpillar Dealer for the correct test procedure and consult your Caterpillar Dealer for the recommended pressure.

i01822494

Seat Belt - Inspect

SMCS Code: 7327-040

S/N: 5YR1-Up

S/N: 6TR1-Up

Always check the condition of the seat belt and the condition of the seat belt mounting hardware before you operate the machine. Replace any parts that are damaged or worn before you operate the machine.

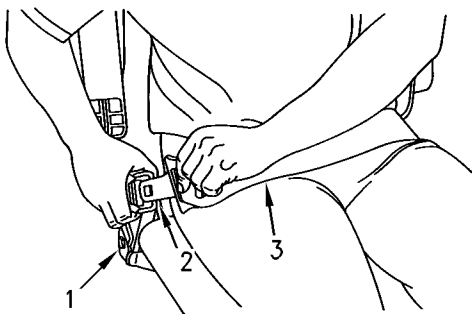


Illustration 278

g00932801

Typical example

Check the seat belt mounting hardware (1) for wear or for damage. Replace any mounting hardware that is worn or damaged. Make sure that the mounting bolts are tight.

Check buckle (2) for wear or for damage. If the buckle is worn or damaged, replace the seat belt.

Inspect the seat belt (3) for webbing that is worn or frayed. Replace the seat belt if the seat belt is worn or frayed.

Contact your Caterpillar dealer for the replacement of the seat belt and mounting hardware.

Note: Within three years of the date of installation or within five years of the date of manufacture, replace the seat belt. Replace the seat belt at the date which occurs first. A date label for determining the age of the seat belt is attached to each seat belt.

i01866630

Seat Belt - Replace

SMCS Code: 7327-510

S/N: 5YR1-Up

S/N: 6TR1-Up

Within three years of the date of installation (2) or within five years of the date of manufacture (1), replace the seat belt. Replace the seat belt at the date which occurs first. A date label for determining the age of the seat belt is attached to each seat belt.

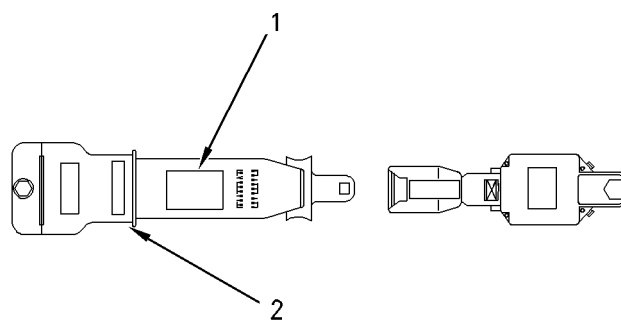


Illustration 279

g00951532

(1) Date of Manufacture
(2) Date of Installation

Contact your Caterpillar dealer for the replacement of the seat belt.

i01699996

Seat Oil Line Screen - Clean

SMCS Code: 7324-070-Z3

S/N: 5YR1-Up

S/N: 6TR1-Up

Note: The hydraulic suspension seat is an attachment for this machine.

1. Lower the seat completely and stop the engine.

i01700012

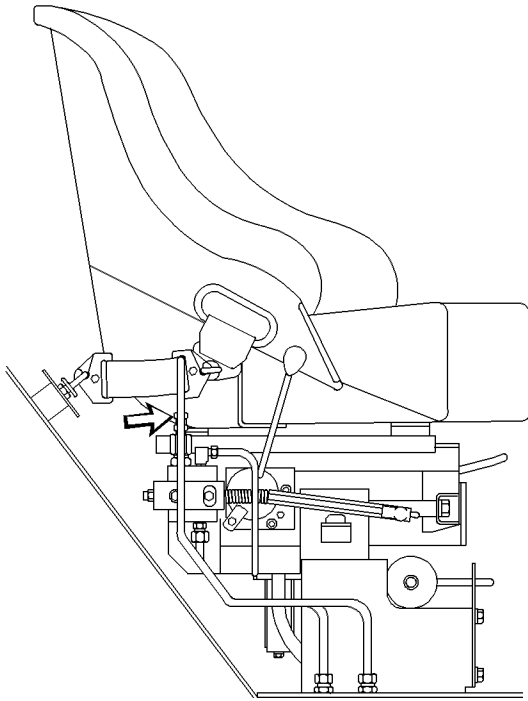


Illustration 280

g00103138

2. Disconnect the oil line at the rear of the operator seat.
3. Remove the screen.
4. Wash the screen in a clean, nonflammable solvent. Allow the screen to dry.
5. Install the screen and connect the oil line.

Steering Pump Outlet Screen - Clean

SMCS Code: 4306-070-Z3

S/N: 5YR1-Up

S/N: 6TR1-Up

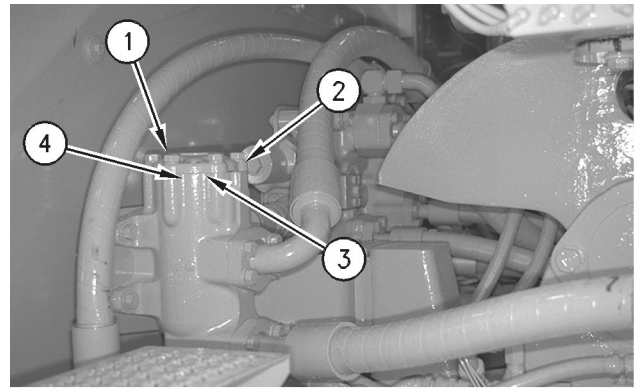


Illustration 281

g00103067

Note: Clean the steering pump outlet screen when there is pump failure or pump change in the hydraulic system.

The steering pump outlet screen is located inside the left frame rail of the tractor.

1. Remove the bolts (1) and the screen cover (2).
2. Inspect the cover seal (3). Replace the cover seal (3) if the seal is damaged.
3. Remove the steering pump outlet screen (4). Clean the screen (4) and the screen cover (2) in a nonflammable solvent.
4. Install the screen (4), cover seal (3), cover (2) and bolts (1).

i01700024

Suction Screen (Transmission Scavenge) - Clean

SMCS Code: 3030-070-Z3

S/N: 5YR1-Up

S/N: 6TR1-Up

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

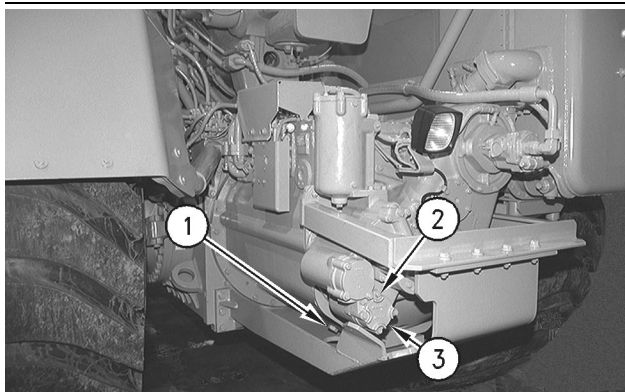


Illustration 282

g00875305

The suction screen for the transmission is located at the rear of the transmission.

1. Park the machine on level ground. Lower the bowl. Apply the parking brake. Shut off the engine.
2. Clean the area around the housing for the screen.
3. Remove the drain plug (1). Allow the oil to drain into a suitable container.
4. Remove the bolts (2) for the cover of the screen.
5. Remove the cover (3).

6. Remove the screen. Clean the screen in nonflammable solvent. Inspect the screen for damage. Replace the screen if the screen is damaged.
7. Install the screen. Inspect the seal for the cover. Replace the seal if the seal is damaged.
8. Clean the cover. Install the cover.
9. Clean the plug. Install the plug.
10. Start the engine.
11. Check the area around the screen housing for leaks.
12. Check the transmission oil level. Add oil if oil is needed.
13. Shut off the engine.

i01863872

Tire Inflation - Check

SMCS Code: 4203-535-AI

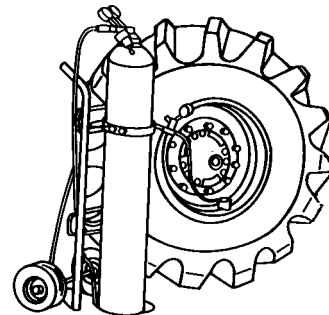


Illustration 283

g00103147

Measure the pressure on each tire. Consult your tire dealer for the correct load rating and for the correct operating pressures.

If necessary, inflate the tires. Refer to the following additional information about tire inflation:

- Operation and Maintenance Manual, "Tire Inflation with Nitrogen"
- Operation and Maintenance Manual, "Tire Shipping Pressure"
- Operation and Maintenance Manual, "Tire Inflation Pressure Adjustment"

- Operation and Maintenance Manual, "Tire Information"

i01700144

Transmission Breather - Clean

SMCS Code: 3030-070-BRE

S/N: 5YR1-Up

S/N: 6TR1-Up

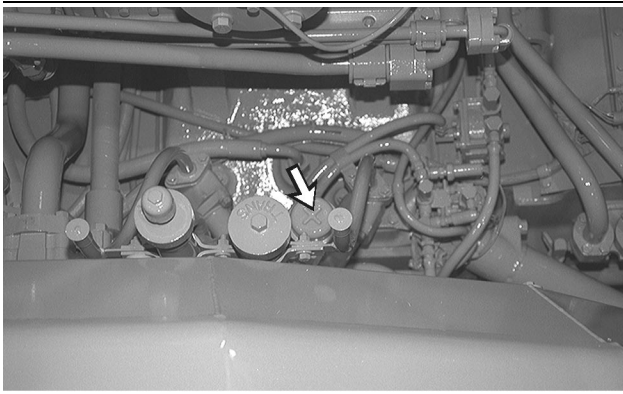


Illustration 284

g00103213

The transmission breather for the tractor is located on the top of the transmission and at the right rear of the tractor.

Use the following procedure to clean the breather.

1. Clean the area around the breather.
2. Remove the breather.
3. Wash the breather in clean, nonflammable solvent.
4. Allow the breather to dry.
5. Install the breather.

i01703906

Transmission Breather - Clean

SMCS Code: 3030-070-BRE

S/N: 6PR1-Up

S/N: 7KR1-Up



Illustration 285

g00877251

The transmission breather for the scraper is located at the rear of the scraper.

Use the following procedure to clean the breather.

1. Clean the area around the breather.
2. Remove the breather.
3. Wash the breather in clean, nonflammable solvent.
4. Allow the breather to dry.
5. Install the breather.

i01700216

Transmission Oil - Change

SMCS Code: 3030-044

S/N: 5YR1-Up

S/N: 6TR1-Up



Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Operate the engine until the transmission oil is warm. Park the machine on a level surface. Lower the bowl until the bowl exerts a slight downward pressure on the ground.

Engage the parking brake. Stop the engine.

1. The transmission drain plug is located under the transmission.



Illustration 286

g00103203

2. Remove the transmission drain plug and drain the oil into a suitable container.

Note: Discard the drained fluids according to local regulations.



Illustration 287

g00103206

3. Remove the sump drain plug and drain the oil into a suitable container.
4. Change the filter element. Refer to the Operation and Maintenance Manual, "Transmission Oil Filter and Magnetic Screen - Replace/Clean".



Illustration 288

g00103205

5. Remove the cover for the scavenge screen.
6. Remove the scavenge screen from the housing.
7. Wash the scavenge screen in a clean, nonflammable solvent.
8. Clean the cover for the scavenge screen and inspect the seal. Replace the seal if damage or wear is evident.
9. Insert the scavenge screen into the housing.
10. Install the housing cover. Tighten the bolts in the housing cover.
11. Clean the transmission drain plug and install the transmission drain plug.
12. Clean the sump drain plug and install the sump drain plug.

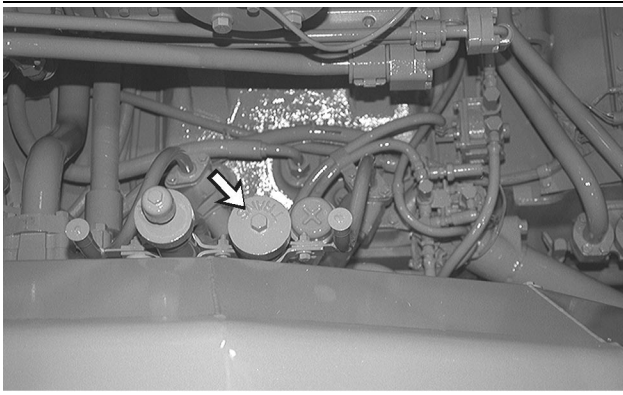


Illustration 289

g00103211

13. Fill the transmission with oil through the filler tube. Refer to the Operation and Maintenance Manual, "Capacities (Refill)" and the Operation and Maintenance Manual, "Lubricant Viscosities".

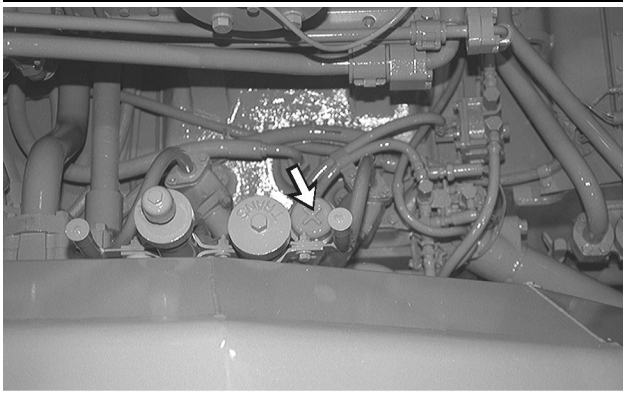


Illustration 290

g00103213

14. Remove the transmission breather.
15. Wash the transmission breather in a clean, nonflammable solvent.
16. Install the transmission breather.
17. Start the engine. Run the engine at low idle. Inspect the transmission for leaks.
18. Slowly operate the transmission direction and speed control in order to circulate the oil.

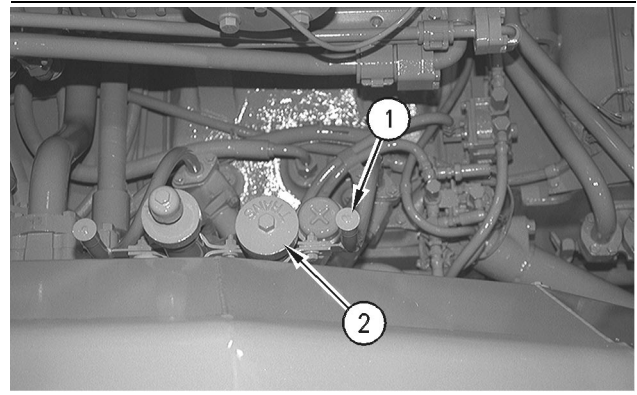


Illustration 291

g00103214

19. Maintain the oil level between the "FULL" and "ADD OIL" marks on the dipstick (1). Add oil through filler tube (2), if necessary.

20. Stop the engine.

i01704781

Transmission Oil - Change

SMCS Code: 3030-044

S/N: 6PR1-Up

S/N: 7KR1-Up

WARNING

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Operate the engine until the transmission oil is warm. Park the machine on a level surface. Lower the bowl until the bowl exerts a slight downward pressure on the ground.

Engage the parking brake. Stop the engine.

1. The transmission drain plug is located under the transmission.

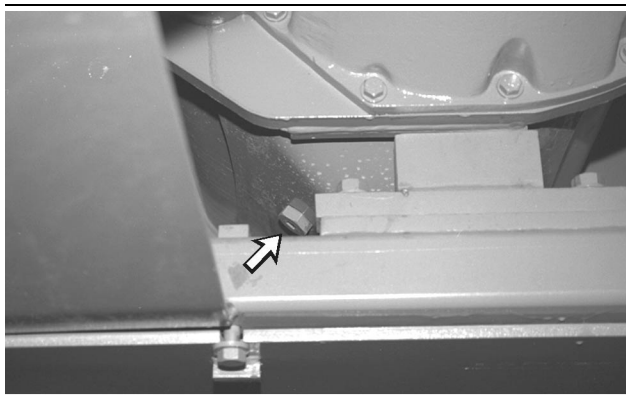


Illustration 292

g00877463

2. Remove the transmission drain plug and drain the oil into a suitable container.

Note: Discard the drained fluids according to local regulations.

3. Change the filter element. Refer to the Operation and Maintenance Manual, "Transmission Oil Filter and Magnetic Screen - Replace/Clean".

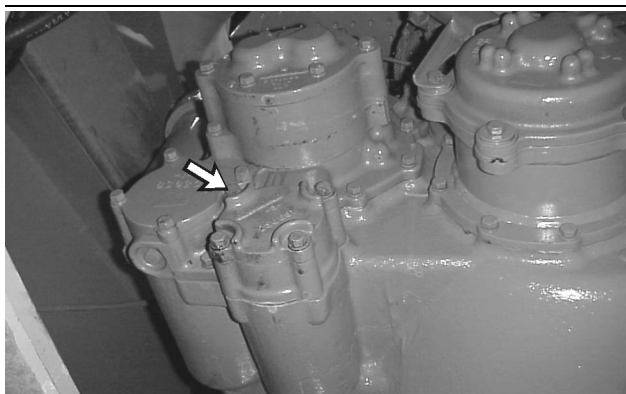


Illustration 293

g00877466

4. Remove the cover for the scavenge screen.
5. Remove the scavenge screen from the housing.
6. Wash the scavenge screen in a clean, nonflammable solvent.
7. Clean the cover for the scavenge screen and inspect the seal. Replace the seal if damage or wear is evident.
8. Insert the scavenge screen into the housing.
9. Install the housing cover. Tighten the bolts in the housing cover.

10. Clean the transmission drain plug and install the transmission drain plug.

11. Clean the sump drain plug and install the sump drain plug.

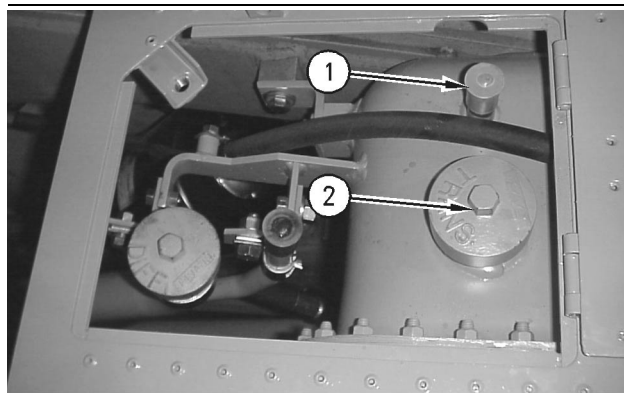


Illustration 294

g00877468

12. Fill the transmission with oil through filler tube (2). Refer to the Operation and Maintenance Manual, "Capacities (Refill)" and the Operation and Maintenance Manual, "Lubricant Viscosities".



Illustration 295

g00877251

13. Remove the transmission breather.
14. Wash the transmission breather in a clean, nonflammable solvent.
15. Install the transmission breather.
16. Start the engine. Run the engine at low idle. Inspect the transmission for leaks.
17. Slowly operate the transmission direction and speed control in order to circulate the oil.
18. Maintain the oil level between the "FULL" and "ADD OIL" marks on the dipstick (1). Add oil through filler tube (2), if necessary.
19. Stop the engine.

i01704763

Transmission Oil Filter and Magnetic Screen - Replace/Clean

SMCS Code: 3030-070-MGS; 3067-510

S/N: 5YR1-Up

S/N: 6TR1-Up

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

The transmission oil filter is located on the top left side of the transmission case. The magnetic screen is at the rear of the transmission case.



Illustration 296

g00103184

1. Remove the transmission filter housing drain plug. Allow the oil to drain into a suitable container.

Note: Discard the drained fluids according to local regulations.

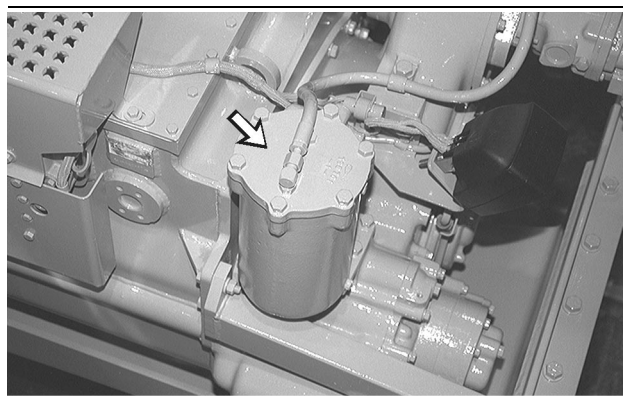


Illustration 297

g00103185

2. Remove the bolts from the filter housing and remove the cover from the filter housing.
3. Remove the used filter element and discard the used filter element.
4. Clean the filter housing and the transmission filter housing drain plug with a clean, nonflammable solvent.
5. Insert a new filter element into the filter housing.
6. Inspect the filter housing seal. Replace the filter housing seal if the filter housing seal is damaged.
7. Install the cover on the filter housing.
8. Install the transmission filter housing drain plug in the filter housing.

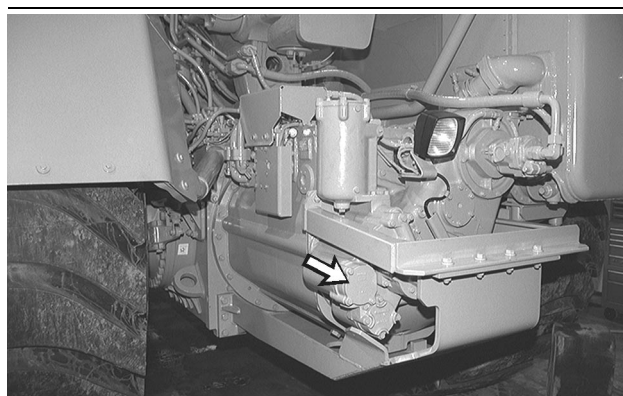


Illustration 298

g00103186

9. Remove the magnetic screen cover slowly. Allow the oil to drain into a suitable container.
10. Remove the magnetic screen.
11. Separate the magnets and the tube assembly from the screen.

12. Wash the screen and the tube assembly in a clean, nonflammable solvent.
13. Allow the screen and the tube assembly to dry.

NOTICE

Do not drop or rap magnets on hard objects, or damage can result. Replace damaged magnets.

14. Clean the magnets with a cloth or with a stiff bristle brush. Allow the magnets to dry.
15. Install the magnets and the tube assembly into the screen.
16. Install the magnetic screen.
17. Inspect the cover seal. Replace the cover seal if the cover seal is damaged.
18. Install the cover and tighten the bolts.
19. Start the engine. Apply the service brake.
20. Slowly operate the transmission direction and speed control in order to circulate the transmission oil.
21. Move the transmission direction and speed control to the NEUTRAL position. Engage the parking brake. Inspect the transmission for leaks.

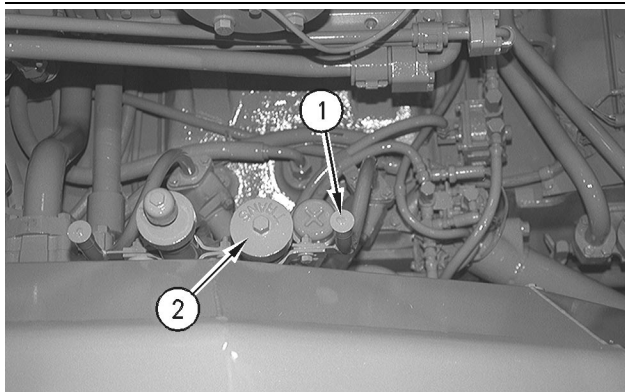


Illustration 299

g00103194

22. Maintain the oil level between the "FULL" and "ADD OIL" marks on dipstick (1). Add the oil through filler tube (2), if necessary.
23. Stop the engine.

Transmission Oil Filter and Magnetic Screen - Replace/Clean

SMCS Code: 3030-070-MGS; 3067-510

S/N: 6PR1-Up

S/N: 7KR1-Up

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

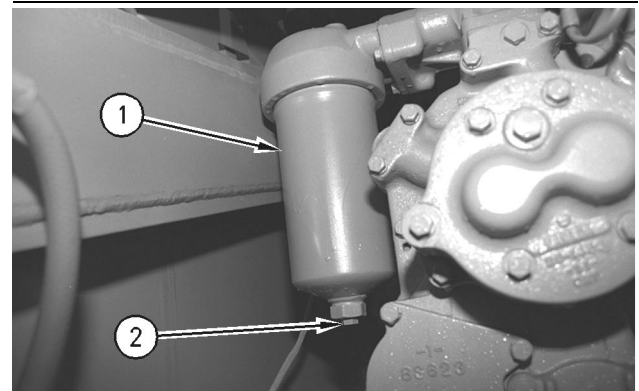


Illustration 300

g00877370

The transmission oil filter housing (1) is located on the left side of the transmission case. The transmission oil filter housing is located at the left rear of the scraper engine.

1. Park the machine on level ground. Apply the parking brake. Lower the bowl.
2. Clean the filter housing.
3. Remove the transmission filter housing drain plug (2). Allow the oil to drain into a suitable container.
4. Remove transmission filter housing (1).
5. Remove the used filter element and discard the used filter element.

6. Clean the inside of the filter housing with a clean towel.
7. Insert a new filter element into the filter housing.
8. Inspect the filter housing seal. Replace the seal if the seal is damaged.
9. Install the cover on the filter housing.
10. Install the transmission filter housing drain plug in the filter housing.

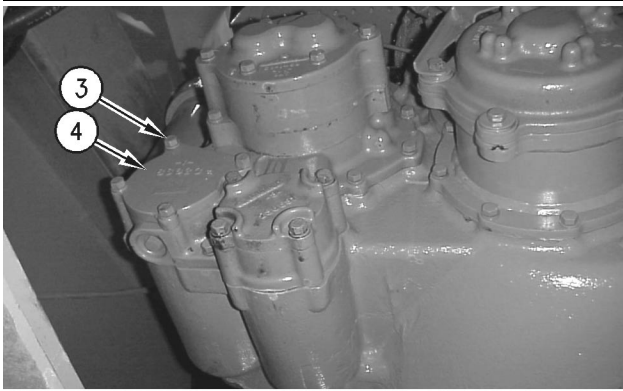


Illustration 301

g00877371

The magnetic screen is located on the left side of the transmission for the scraper.

1. Remove the bolts (3).
 2. Remove the cover (4).
 3. Remove the screen.
 4. Separate the magnets from the screen. Wash the screen and the magnets in a nonflammable solvent.
- Note:** Do not rap the magnets on hard objects. The magnets may be damaged. Replace damaged magnets.
5. Allow the cleaned parts to dry. Use compressed air pressure in order to speed the drying of the parts.
 6. Clean the magnets with a towel or clean the magnets with a stiff bristle brush.
 7. Install the magnets into the screen.

8. Install the magnetic screen into the housing.
9. Install the cover and the bolts.
10. Start the engine. Apply the parking brake.
11. Run the engine at low idle.

12. Check the filter for leaks. Check the magnetic screen for leaks.
13. Shut off the engine.
14. Check the oil level of the transmission. Some oil may be needed. Add oil if oil is needed.

i01708528

Transmission Oil Level - Check

SMCS Code: 3030-535-FLV

S/N: 5YR1-Up

S/N: 6TR1-Up

The dipstick for the transmission oil level is located on the back left side of the tractor.

Note: The machine must meet the following conditions before checking the transmission oil level.

- The machine must be level.
- The parking brake must be engaged.
- The transmission oil must be warm.
- The engine must be running at low idle.
- The transmission direction and speed control must be in the "NEUTRAL" position.

Wipe all of the cover and wipe all of the surfaces around the opening before adding transmission oil.

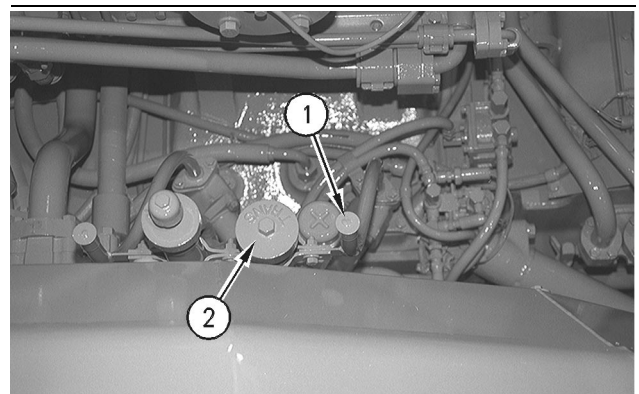


Illustration 302

g00103257

1. Maintain the oil between the "FULL" and the "ADD OIL" marks on dipstick (1).
2. Remove oil filler cap (2) and add oil, if necessary.
3. Clean the filler cap and install the filler cap.

i01704587

Transmission Oil Level - Check

SMCS Code: 3030-535-FLV

S/N: 6PR1-Up

S/N: 7KR1-Up

The dipstick for the transmission oil level is located on the backright side of the scraper.

Note: The machine must meet the following conditions before checking the transmission oil level.

- The machine must be level.
- The parking brake must be engaged.
- The transmission oil must be warm.
- The engine must be running at low idle.
- The transmission direction and speed control must be in the "NEUTRAL" position.

Wipe all of the cover and wipe all of the surfaces around the opening before adding transmission oil.

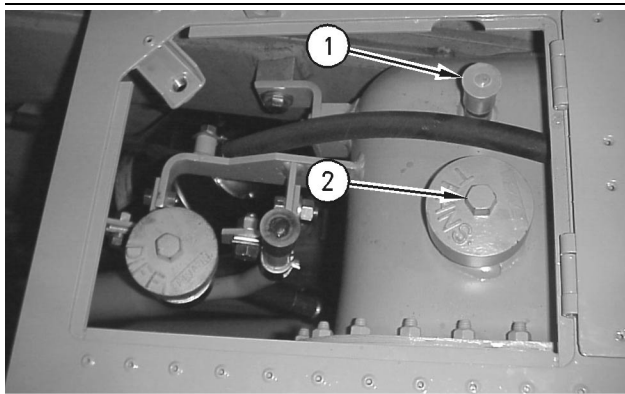


Illustration 303

g00877359

1. Maintain the oil between the "FULL" and the "ADD OIL" marks on dipstick (1).
2. Remove oil filler cap (2) and add oil, if necessary.
3. Clean the filler cap and install the filler cap.

i01922472

Transmission Oil Sample - Obtain

SMCS Code: 3030-008; 7542-008

S/N: 5YR1-Up

S/N: 6TR1-Up

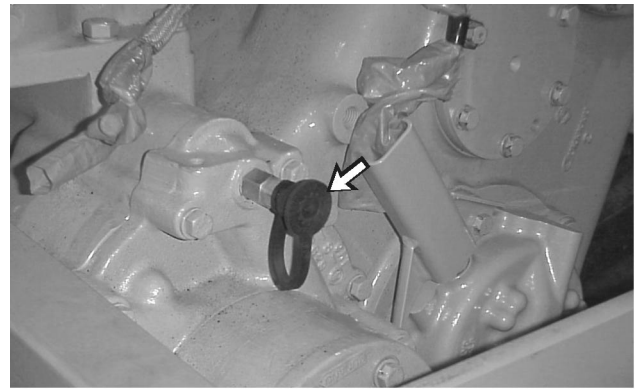


Illustration 304

g00877300

The sampling valve for the tractor transmission is located at the rear of the transmission.

Refer to Special Publication, SEBU6250, "S·O·S Oil Analysis" for information that pertains to obtaining a sample of the transmission oil. Refer to Special Publication, PEHP6001, "How To Take A Good Oil Sample" for more information about obtaining a sample of the transmission oil.

i01922467

Transmission Oil Sample - Obtain

SMCS Code: 3030-008; 7542-008

S/N: 6PR1-Up

S/N: 7KR1-Up

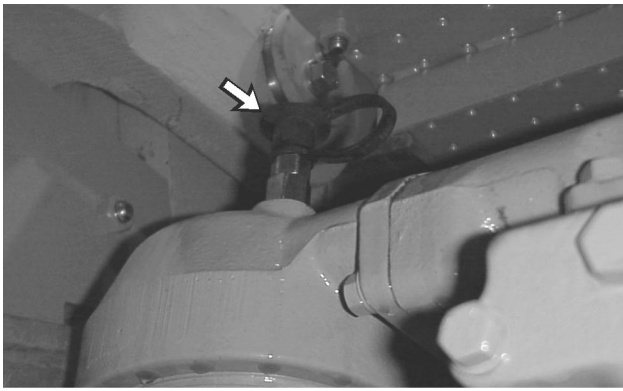


Illustration 305

g00877312

The sampling valve for the scraper transmission is located on the top of the transmission filter. The transmission filter is located on the left side of the scraper.

Refer to Special Publication, SEBU6250, "S-O-S Oil Analysis" for information that pertains to obtaining a sample of the transmission oil. Refer to Special Publication, PEHP6001, "How To Take A Good Oil Sample" for more information about obtaining a sample of the transmission oil.

i01394768

Turbocharger - Inspect

SMCS Code: 1052-040

If the turbocharger fails during engine operation, severe damage to the turbocharger compressor wheel and to the entire engine can result.

Turbocharger bearing failures can cause large quantities of oil to enter the intake system and the exhaust system. Loss of engine oil can result in serious engine damage.

Do not continue to operate the engine when a turbocharger bearing failure is accompanied by a significant loss of engine performance. Engine smoke and speeding up of the engine with no load are characteristics of a loss of engine performance.

Reference: For more information about inspecting the turbocharger, refer to the appropriate Service Manual for your machine's engine.

i01774893

Wheel Coolant Level - Check

SMCS Code: 4207-535-FLV

WARNING

With a lack of wheel coolant, personal injury or death can result. The brakes can generate enough heat to burn the tire bead. A burning bead produces gases inside the tire that can explode, endangering personnel within 500 meters (1500 feet).

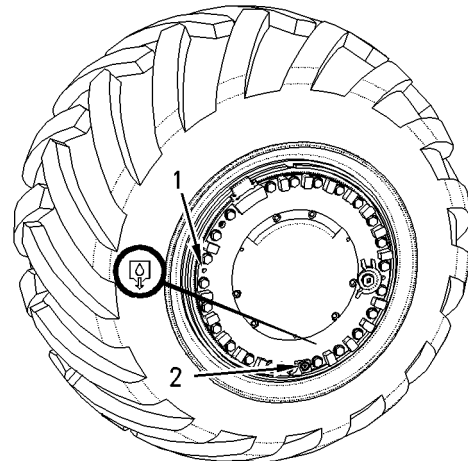


Illustration 306

g00907284

Driven wheels

Check/fill plug (1) for the wheel coolant is located on the outer edge of the wheel. The check/fill plug is easily confused with drain plug (2) for the final drive. Drain plug (2) has a symbol that is next to the plug. For the correct identification of drain plug (2), refer to Operation and Maintenance Manual, "Differential and Final Drive Oil - Change".

1. Check/fill plug (1) must be horizontal with the center line of the axle in order to check the coolant level.
2. Clean the area around the plug hole.
3. Remove the plug. Antifreeze should be dripping from the hole.

4. Add antifreeze if antifreeze is needed. A solution of 50 percent water and 50 percent Caterpillar antifreeze is preferable. If Caterpillar antifreeze is not used, commercially available ethylene glycol-type antifreeze can be a substitute.
5. Clean the plug. Install the plug.
6. Perform the same procedure to the other driven wheels.

i01698056

Window Washer Reservoir - Fill

SMCS Code: 7306-544

S/N: 5YR1-Up

S/N: 6TR1-Up

NOTICE

Use Caterpillar nonfreezing window washer solvent or a commercially available windshield washer fluid in order to prevent freezing of the windshield washer system.



Illustration 307

g00874244

Open the access panel.

1. Remove the cap of the reservoir.
2. Fill the window washer reservoir through the filler opening.
3. Replace the cap of the reservoir.
4. Close the access panel.

i01364987

Window Wiper - Inspect/Replace

SMCS Code: 7305-040; 7305-510

S/N: 5YR1-Up

S/N: 6TR1-Up

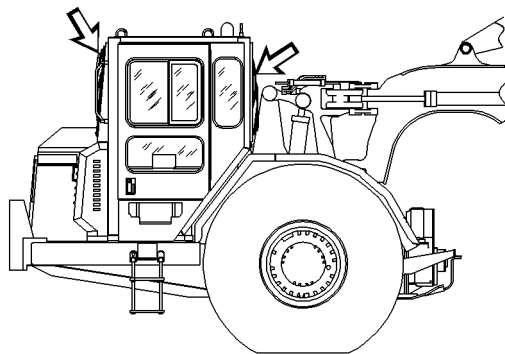


Illustration 308

g00787891

One window wiper is located at the cab front window. One window wiper is located at the cab rear window. The window wipers have replaceable wiper blades.

Replace the wiper blades when the following conditions occur:

- The wiper blades streak the windows of the cab.
- The wiper blades are damaged.
- The wiper blades are worn.

Note: Damaged wiper blades may cause permanent damage to the glass of the cab windows.

i01698037

Windows - Clean

SMCS Code: 7310-070

S/N: 5YR1-Up

S/N: 6TR1-Up



Illustration 309

g00874210

Use commercially available window cleaning solutions in order to clean the windows.

Lift the latch in order to slide the windows.